

**NAVAL POSTGRADUATE SCHOOL**  
**Monterey, California**



**THESIS**

**APPLICABILITY OF SUBSISTENCE PRIME  
VENDOR TO CONTINGENCY RATIONS**

by

David B. Bailey

December, 1996

Thesis Co-Advisors:

Jane Feitler  
Erik Jansen

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**APPLICABILITY OF SUBSISTENCE  
PRIME VENDOR  
TO CONTINGENCY RATIONS**

David B. Bailey  
Captain, United States Army  
B.A., University of Louisville, 1988

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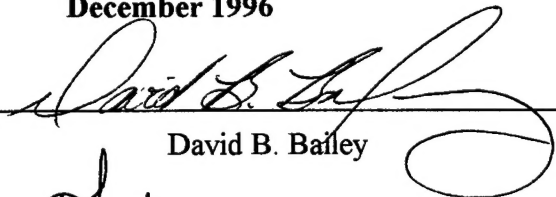
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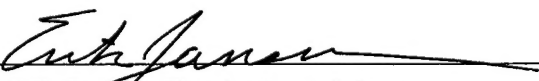
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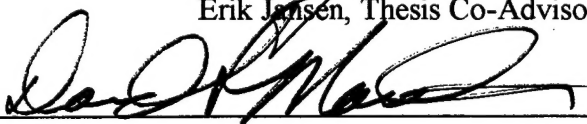
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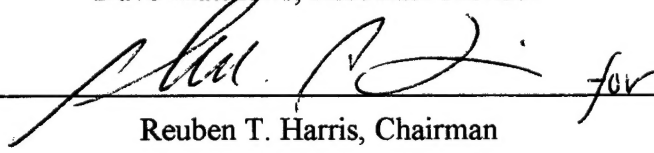
  
David B. Bailey

Approved by:

  
Jane Feitler, Thesis Co-Advisor

  
Erik Jensen, Thesis Co-Advisor

 26 Nov 96  
Dave Matthews, Associate Advisor

 for  
Reuben T. Harris, Chairman  
Department of Systems Management





## **ABSTRACT**

This study evaluates the Subsistence Prime Vendor program in the Armed Services and the Department of Defense (DoD). This thesis provides an assessment of Prime Vendor successes, concerns, and whether this program can be implemented for contingencies and contingency rations. Additionally, this study explores the use of Total Asset Visibility (TAV) in defining the interface between the military and commercial sectors.

Prime Vendor (and Direct Vendor) programs were initiated in 1993 to achieve cost savings in the supply and distribution of subsistence to DoD customers. The intent of the Prime Vendor program is to provide the military with an exceptional distribution and inventory control methodology. However, several critical issues remain unaddressed. Force preparedness and readiness in wartime remain nagging questions. Despite the momentum that this and other privatization efforts have gained, many of the benefits, specifically with respect to cost-savings, have not been fully identified or realized in "real" terms.

Current Total Asset Visibility (TAV) ventures and projects still fail to identify and articulate the interface between commercial and military logistics systems. Subsequently, I propose that the interface between the military and civilian logistics structures must occur in CONUS (Continental United States) or at the wholesale level in-theater. The aggressive use of EDI (Electronic Data Interchange) can promote high levels of administrative efficiency and accuracy once this interface is established.



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## **I. INTRODUCTION**

This thesis focuses on the Subsistence Prime Vendor (SPV) program and concentrates on its applicability to contingency operations. Subsistence Prime Vendor is the use of commercial companies to perform inventory and distribution functions previously done by the Defense Personnel Support Center (DPSC). Contingency operations span a broad range of military operations from "Operations Other than War" (Haiti, Somalia, Bosnia) to "War" (Desert Storm). This analysis will assess the military ability to provide subsistence in support of the national contingency mission of two nearly-simultaneous medium regional conflicts ("War"). The term "subsistence" will be used extensively as the Army's general term for food items. Total Asset Visibility (TAV) has become increasingly important as both the commercial and public sectors attempt to reduce inventory and increase responsiveness. TAV enables managers to know exactly "what" supplies are "where" in the supply pipeline. Special emphasis will be placed on defining the interface between the military and commercial sectors through TAV initiatives for this commodity.

Peacetime subsistence distribution through the Subsistence Prime Vendor Program has been judged to be a viable (ABC News, March 1996; DPSC, September 1996) supply concept. Prime Vendor clearly does address many peacetime customer complaints with the current Defense Personnel Supply Center (DPSC) distribution system. Brand name products are now available to military Dining Facilities, and the response time from vendors has significantly improved. However, definitive cost-data have not been



generated and are not available. (DPSC was reluctant to release detailed cost data due to incompleteness). The Defense Logistics Agency (DLA) is working with the civilian sector on applying this model to other supply commodities. However, the long-term effect of the SPV Program on wartime readiness is a significant concern.

## **A. BACKGROUND**

Privatization, downsizing, outsourcing, and consolidation are trends within the Federal Government today. Department of Defense (DoD) activities represent a significant portion of discretionary spending and have been reduced to realize the "peace dividend." Fueled by the Defense Management Review (DMR) process, tighter Federal budgets, and other initiatives, the privatization of many warehousing functions in DoD has become a reality. These efforts started with the elimination of intermediate stock levels and the consolidation of supply depots. Other areas now are being pursued to continue the trend.

### **1. Prime Vendor**

The Defense Logistics Agency (DLA) initiated the Prime Vendor and Direct Vendor models in 1993 to achieve cost-savings in the supply and distribution of medical supplies to DoD customers (Medical Prime Vendor). The goals of these programs are to achieve cost-savings by reducing inventories, personnel and support infrastructures, and to gain efficiencies by transferring these functions from the public to the private sector. In 1995, DLA applied the Prime Vendor model to food items under the rubric of Subsistence Prime Vendor.

Meanwhile, the Prime Vendor initiative is pushing forward at full steam with little consideration for many unresolved concerns and issues that still require attention. Despite the cost-savings propounded by program advocates, clear cost-savings data have not been adequately identified. Clearly, there are cost-savings to be realized in reducing inventory, infrastructure and personnel levels, but little documented evidence of long-term systemic savings exists.

## **2. Concerns**

Readiness remains the principal Service concern with Prime Vendor programs. When the support infrastructures are drawn down, the capability and willingness of commercial vendors to maintain affordable support is untested. Many other support issues also remain to be solved, including; local delivery procedures to ships, packing and shelf life requirements, price standardization, records-keeping, asset tracking (TAV), and accountability.

## **3. Inventory Visibility**

Obtaining visibility of requisitions and supplies in both the military and vendor distribution systems will be critical to resupplying military consumers accurately. Currently, all the Services are pursuing research into real-time requisition flow and supply status information. One example is the Army's Total Asset Visibility initiative. This initiative allows customers to see the current location of either a requisition in the supply system or the item filling that requisition. These initiatives benefit not only the consuming unit, but allow logistics managers to more accurately forecast resupply times and to expedite supplies according to user needs.

Current Total Asset Visibility initiatives are limited to providing visibility to supplies only within the confines of the DoD management information systems. Integrative TAV programs, such as Joint Total Asset Visibility (JTAV), are being used to provide logistics inter-operability of the Services. However, no such integration currently is possible with the commercial sector. The information interface between the military and commercial sectors cannot provide instantaneous visibility over civilian contractor-initiated government shipments. A Department of Transportation (DoT) system, VENEX-2, will be analyzed as a potential system to define this interface. VENEX-2 possesses the potential to enhance existing Service TAV capabilities by directly providing commercial shipment data to military information systems.

## **B. RESEARCH OBJECTIVE**

The research objective of this thesis is to assess how the Prime Vendor program can provide the military with an exceptional distribution and inventory control method in the event of a contingency. (White, D., June 1993; White, K., December 1994) Precisely how wartime resupply will occur is an unresolved issue in current contingency plans. The idea of outsourcing operations (through Prime Vendor) that do not add "value" to the military enterprise has merit (Skibble, December 1995). However, with the introduction of commercial suppliers, the military will still retain control over logistics systems established in hostile conflict zones. Training and logistics interfaces between military personnel and civilian distribution systems will be critical to both the ability to resupply and to forecast demand.

## **1. Decision Making and Planning**

The analysis of current qualitative decision modeling and planning will be critical to implementing a program such as Prime Vendor. Through analysis of commercial sector experience and logistics risk management, it can be determined what portions of the logistics structure (core competencies) should remain under DoD control. Logistics risk management should identify elements that are not adding value to become candidates for outsourcing via Prime Vendor. DoD must then develop incentive programs to motivate subsequent DoD suppliers to further minimize the total risk assumed by the Services. The mating of accurate plans and a pro-active supply methodology are crucial to readiness maintenance. Current Army contingency plans, vendor capabilities, and systems weaknesses will be examined in Chapter III with the Unitized Group Ration family of operational rations.

## **2. Adding "Value" with Total Asset Visibility**

It is necessary for logisticians to provide end-users real-time or near-real-time status when and where possible. In order to do this, the Services must "see" the entire supply process from the distributor to the military supply handler. This ability is part of an ongoing effort called Total Asset Visibility (TAV). While integration of Service systems are taking place, current Army tactical distribution systems cannot interface directly with the commercial sector. Subsistence Prime Vendor has not been a focus for this effort, but it is being used to build an interface with peacetime Army food management systems. Thus, SPV presents an ideal environment in which to develop a tactical "seamless

logistics” model incorporating Total Asset Visibility. (Harman, January/February 1996, Robison, July/August 1995)

The potential for cost-savings in time, personnel and equipment by using TAV in conjunction with Prime Vendor is enormous. This potential is best described in the following quote;

We had to open some 28,000 of the 41,000 arriving containers right there on the docks just to find out what was in them. We hauled a lot of containers 2,000 miles out into the desert to find that 10 percent of their contents were intended for the front-line troops, whereas 90 percent belonged to units back near the port. (Pagonis and Cruikshank, 1992)

From the existing TAV initiatives, it is known that combined “joint” visibility of Service inventories can both decrease the amount required in wholesale inventories, and provide theater CINC’s the ability to “cross-level” in-theater to maximize force readiness. Decreased resources and joint programs (such as the Joint Strike Fighter (JSF)) demand a more comprehensive system of inventory management and visibility. Inventory parochialism is a readiness detractor. (U.S. Department of Transportation, December, 1995)

### **C. RESEARCH QUESTIONS**

In the course of this thesis the following questions are addressed:

- Can Subsistence Prime Vendor be applied in contingency operations for operational rations configuration?
- What are the lessons learned from the medical/surgical and pharmacy Prime Vendor contracts that can be applied to Subsistence?

- Can vendors provide the quantity of subsistence components the Army will require in support of current contingency plans? Adequate support of Army requirements involves getting the right amount of supplies to the right place, at the right time. Timing of supply flow from commercial vendors is critical in the supply of subsistence components that build meal modules.
- How can the Prime Vendor Program be implemented to provide Total Asset Visibility for operational ration production in a contingency?

#### **D. METHODS**

The primary approach used in this thesis is to outline specifics of the Department of the Army's (DA) intent for subsistence resupply in both peace and contingencies. Secondly, capabilities and policies of support agencies such as Defense Personnel Support Center and the commercial sector are analyzed to provide insight into the congruence or divergence of plans with current mandates and planning. Finally, discrepancies and areas of concern in the Army's planned contingency ration (the Unitized Group Ration) are identified in light of this convergence or divergence.

This thesis relies primarily on personal interviews and relevant published sources for historical and organizational data. These sources include General Accounting Office (GAO) reports, collected vendor data, an array of published Prime Vendor-related articles or reports, and interviews with commercial wholesale food vendors, DPSC personnel, Prime Vendor Task Force personnel, Army subsistence and Force XXI Battle Lab personnel. These interviews were conducted in person, by telephone, and via electronic mail with primary action officers. Questions asked in interviews were organized around the primary research questions outlined previously but tailored to the individual's area of

expertise (i.e., Industrial Base Analysis, Unitized Group Rations, Army Subsistence Policy, Prime Vendor).

The primary sites selected for on-site interviews were the Defense Personnel Support Center (DPSC), Combined Arms Support Command (CASCOM), and the U.S. Army Quartermaster Center and School (USAQMC&S). These sites represent the major proponent agencies for the Prime Vendor program and the Army Field Feeding System. On-site interviews were conducted with heads of offices and activities directly related to Prime Vendor. At DPSC, 20 personnel were interviewed from the Industrial Support Branch, Produce Unit, Prime Vendor Regions, Readiness Business Unit, Distribution Branch, Medical Material, and Food Service Unit. Interviews at CASCOM and USAQMC&S activities occurred at Fort Lee with nine primary action officers from the Prime Vendor Project, Class I Automation, Total Asset Visibility, Battle Lab, and Force XXI offices in separate meetings. One remaining on-site interview was conducted with the Defense Language Institute (DLI) Food Service Officer to gather specific site data on Direct Vendor. Supplemental interviews were conducted with the U.S. Department of Transportation, Department of the Army, and other government activities via electronic mail and telephone to clarify technologies or concepts originated in on-site meetings and initial publications research.

Three commercial vendors also were selected for interviews of their distribution policies and plans according to applicability to the subsistence commodity and willingness to be interviewed. Of these vendors, one was a Prime Vendor, and two were worldwide vendors. Of the two worldwide vendors, Purdue Farms is a major frozen and chilled meat

supplier, while Nestle represents an international food manufacturer producing a broad band of products. Additionally, neither Nestle nor Purdue have direct vested interests in current Prime Vendor contracts.

Published sources used in this thesis provided policy and procedures guidelines by which to evaluate the Prime Vendor Program. Government reports (i.e., Inspector General and GAO reports) often provided very specific data on the subject matter. However, when related areas outside the narrow subject of Prime Vendor also were considered, a broader picture of the problem emerged. To broaden this picture and to provide relevant feedback on commercial practices, several management publications, business articles, and other DoD documents were used to evaluate the use of commercial business practices in managing subsistence distribution.

## **E. SCOPE AND LIMITATIONS**

The scope of the analysis will be on Army implementation of Prime Vendor and Total Asset Visibility Projects as related to the operational rations in a contingency. This thesis analyzes the Subsistence Prime Vendor Program as currently applied to peacetime, garrison operations. The current Subsistence Prime Vendor Program was not originally designed to be used on a regular basis in contingencies. This research also focuses on the use of Subsistence Prime Vendor as applied to the Army tactical food distribution system. Though applied to Army systems, the same basic concepts are applicable to all services. This is especially true for the discussion on Total Asset Visibility (TAV).



This study examines the Force XXI Class I (Subsistence) efforts being conducted at Fort Lee, VA, by the Combined Arms Support Command (CASCOM) Battle Lab in conjunction with the Army Center for Excellence, Subsistence (ACES). Some analysis of Navy sites and concerns are presented, but the major viewpoints expressed will be from an Army perspective. Although focusing primarily on one Service, this thesis provides viable recommendations that can be tailored by other Services according to their specific needs.

Although the Prime Vendor concept was initiated in 1993 for pharmaceutical supplies, Prime Vendor initiatives remain in dynamic change. The Subsistence Prime Vendor program has continued to change while this thesis was being researched and written, and some inconsistencies may be incurred by the time this thesis is distributed. For example, in July 1996, Fresh Fruits and Vegetables (FF&V) were removed from the SPV program, and control over these items was given back to the Defense Personnel Supply Center (DPSC).

## **F. CURRENT SUBSISTENCE PRACTICES**

Current subsistence requisitioning procedures are Service-specific. There is no integration or visibility of subsistence inventories. The process is paper-intensive with an extensive use of forms. The average turnaround time for a requisition in the DPSC system has typically been about 45 days. This time includes shipping, distribution, procurement, handling, and movement to installation warehouses, depending on the item and season. Dining Facilities then draw rations from the central installation warehouse (Troop Issue

Subsistence Activity -TISA) for preparation by military or contracted food service personnel.

Tactical food distribution differs substantially from garrison food distribution. In the Army, rations are requested by a cook on manual forms. These forms are hand-carried to a TISA or Field Ration Break Point (FRBP). This requisition is then filled from available stocks on-hand based on headcount and feeding cycle forecasts. The rations are forecasted and further requisitioned by the TISA/FRBP via paper forms. Distribution of the rations to the FRBP is typically by military or commercial truck.

For tactical applications, rations may consist of Traypack (T-rations), Meals Ready to Eat (MRE), A-rations (fresh foods and foods requiring refrigeration), B-rations (dehydrated and canned foods not requiring refrigeration), or Unitized Group Rations (UGR). The A-ration meal generally is not used in tactical field feeding applications, except as supplemental items or special meals. (Harsh, September 1996)

Prime Vendor has not been formally applied to the supply of rations in contingency operations. However, in more recent ventures, DLA has used Prime Vendor to supply A-ration type items. These items have included dairy products, breads, and vegetables. Prime Vendor has not been used to supply B-rations, MRE's, or T-rations in any contingency.

## **G. THESIS ORGANIZATION**

The thesis will be divided into five parts. Chapter I provides the thesis objective and the scope of the analysis. Chapter II presents an overview and history of the

Subsistence Prime Vendor Program. The Medical Prime Vendor Program is also introduced and discussed because it has been used by numerous agencies as a benchmark for Prime Vendor initiatives. A general analysis of both program's successes and concerns will follow. In Chapter III, a general overview and discussion of Prime Vendor use in recent contingencies and at peacetime installations is presented. In Chapter IV, this study provides a specific assessment of commercial vendors for contingency support and operational ration provision. This Chapter also presents a discussion of TAV and "Vendor Express - 2" (VENEX-2). In Chapter V, the thesis determines the ability of this program to resupply contingency operations and recommend an implementation strategy to achieve Prime Vendor Total Asset Visibility.

## **II. SUBSISTENCE PRIME VENDOR PROGRAM OVERVIEW**

This chapter examines the Defense Personnel Support Center (DPSC) process and the Subsistence Prime Vendor Program (SPV). The DPSC function and purpose will be briefly reviewed. The Prime Vendor Program is discussed in terms of background, history, and Prime Vendor variants. Prime Vendor has two major variants: the regional distributor concept used for Subsistence Prime Vendor and an installation-managed Direct Vendor Delivery (DVD or Direct Vendor) system using multiple local vendors.

Medical products were the first commodities to use Prime Vendor concepts; subsequently, Medical Prime Vendor has become the benchmark and standard for follow-on Prime Vendor Programs. A brief discussion of the Medical Prime Vendor Program is presented to provide insight to the overall strengths and weaknesses of the concept. Concerns and benefits of Prime Vendor contracts and methods are identified at the close of the chapter.

### **A. THE DPSC PROCESS**

The DPSC is located in Philadelphia, PA, and purchases approximately 90 percent of the subsistence consumed by the Armed Forces (GAO/NSIAD-93-110, June 1993). Founded in 1965 to centralize the function of subsistence purchases, DPSC has remained virtually unchanged despite many improvements in the commercial food distribution industry. DPSC provides food for both DoD customers (including overseas installations) and numerous non-DOD customers. Last year, DPSC serviced 298 non-DoD customers.

These customers include agencies such as the Bureau of Prisons, Job Corps, Veterans Administration, Bureau of Indian Affairs, Drug Enforcement Agency, and the General Services Administration. (Amato, August 1996; Faso August 1996)

DPSC purchases subsistence items from a variety of suppliers and then stores them or arranges transportation of items to installation food warehouses (Troop Issue Support Activities (TISA-Army) or Fleet Industrial Supply Centers (FISC-Navy)). DPSC stores semi-perishable foods (dry and canned goods) in five CONUS depots and one overseas depot in Germersheim, Germany. Perishable foods (fresh or frozen fruits, vegetables (FF&V) and meat) are purchased by one of five Defense Subsistence Offices (DSO) located in Philadelphia, PA; Tidewater, VA; Jacksonville, FL; San Francisco, CA; and Seattle, WA (Faso, July 1996)

Subsistence items purchased by DSOs generally are not warehoused longer than 48 hours by DPSC. When possible, items are shipped directly from farmers fields or processing plants to installations via commercial food vendors. In some cases, west coast items are held for a short period (0-48 hours) or "cross-docked" at distribution centers. If cross-docking is used, the food arrives at a distribution center from the vendor, is inspected by USDA inspectors, and is shipped out via third party distribution to the installation. The distribution cross-docking facilities typically hold food for only a matter of hours. (Defense Subsistence Office-Los Angeles, August 1996)

Installation warehouses consolidate both DPSC shipments and end-user requests. DPSC shipments are placed into inventory and issued to the end-users (ships, dining facilities, units in field locations, etc.). End-users normally forecast and request rations up

to 45 days in advance from the TISA (Prior, June 1996). Dining facilities and other customers then pick up their rations from the TISA at periodic intervals.

DoD inventories have been characterized by GAO and Congress as unnecessarily large with a poor stock turnover rate. The DPSC inventory, worth in excess of \$132 million, can fill approximately 82 days of DoD demand. Installation warehouses maintain enough inventory to meet approximately 45 days of demand at a monetary value in excess of \$200 million. DPSC inventories do not include those inventories maintained by the Services in TISAs and similar activities. These Service activities also maintain inventories of differing quantities, according to Service Regulations and to differing mission requirements. For instance, Navy shore facilities maintain approximately 32 days of supply, Navy ships and Army TISAs maintain up to 45 days of supply, and Army dining facilities maintain about 3 days of supply. This results in a "layered" inventory system in many locations with low turnover rates and long lead times. This "layering" of inventory also creates high cumulative inventory levels when measured DoD-wide, and results in some DPSC inventory items being held for up to two years or more. GAO has stated that DPSC inventory turns over (on average for all items) less than twice a year. DPSC managers have challenged the GAO measurements, as discussed later. (GAO/NSIAD-93-110, June 1993)

There are many inefficiencies which contribute to the excessively large inventories. For years, there was little incentive for DPSC to become more efficient because defense activities generally had to purchase from them unless items were demonstrably less expensive from other sources (GAO/NSIAD-93-110, June 1993). The initiation of the

Defense Business Operating Fund (DBOF) system in 1991, however, allowed customers to buy food from wherever they wanted (Faso, June 1996). Phone interviews with DPSC managers have confirmed that this did force DPSC to become more efficient and competitive, but customers may have continued to buy exclusively from DPSC due to either familiarity or ease of requisitioning.

DPSC does not maintain visibility over Service subsistence stock levels. Once subsistence items are issued, DPSC cannot, and does not, track cumulative inventory levels or location of stock at installations. This lack of visibility forces DPSC to increase protection from “stockouts” (failure to have an item on hand when demanded) by building inventory. As a result, DPSC’s forecasting methods facilitate its requisition process, but also build excess inventory. This creates procurement lead times of 120 to 205 days. DPSC subsequently requires base warehouses to order 30 days (or more) in advance. To offset this long lead time, base warehouses increase their inventory size beyond required levels. Services in contiguous locations cannot automatically share inventory data, resulting in duplicated installation inventories and warehouse functions. These practices and asset visibility shortfalls contribute to unnecessarily large DoD food inventories. (Heivilin, March 1995)

The cost of operating DPSC’s system is excessive (GAO/NSIAD-93-110, June 1993) and not entirely accounted for in the DPSC prices. DPSC uses a 16.6% (Fiscal Year 1993) surcharge to cover the cost of procuring and distributing food. This surcharge figure is the most accurate figure that could be achieved in the research for this thesis.

Numbers gathered from DPSC and other sources varied widely, but generally did center around this figure.

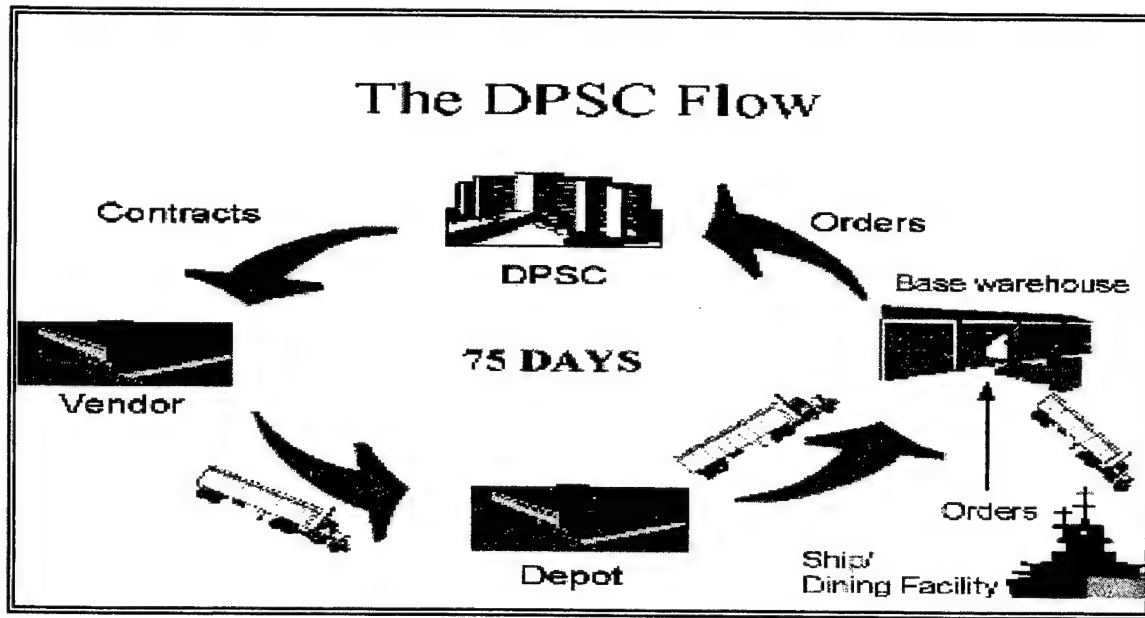
The costs of operating intermediary storage activities (TISA's, Dining Facilities, etc.) and food distribution to end-users are not specifically accounted for by DPSC. The costs that are accounted for by DPSC amount to approximately \$64 million per year to operate depots and DSOs. (GAO/NSIAD-93-110, June 1993)

## **B. SUBSISTENCE PRIME VENDOR AND DIRECT VENDOR**

The Subsistence Prime Vendor Program is a DPSC-managed contract with regional vendors (full-line food distributors) who deliver subsistence directly to dining facilities. This process is outlined in Figure 1.

Prime Vendor contracts with distributors are regional cost-plus-fixed-fee contracts. Suppliers are paid the subsistence cost, according to a DPSC price schedule, plus a twelve percent (on average) fixed fee. In this contract, the vendor assumes responsibility for transportation from the vendor warehouse to the dining facility, bypassing the TISA, FISC, and DPSC facilities. By performing this function, Prime Vendor decreases the need for installation and depot inventories while reducing direct government transportation costs. The vendor provides almost all inventory functions as part of the contract and delivers directly to dining facilities or ships in U.S. ports. The commercial vendor is also responsible for delivering food items every 2-3 days in accordance with individual dining facility forecasts. (Ford, September 1996)





**Figure 1:** Pre-Prime Vendor supply flow (overview).

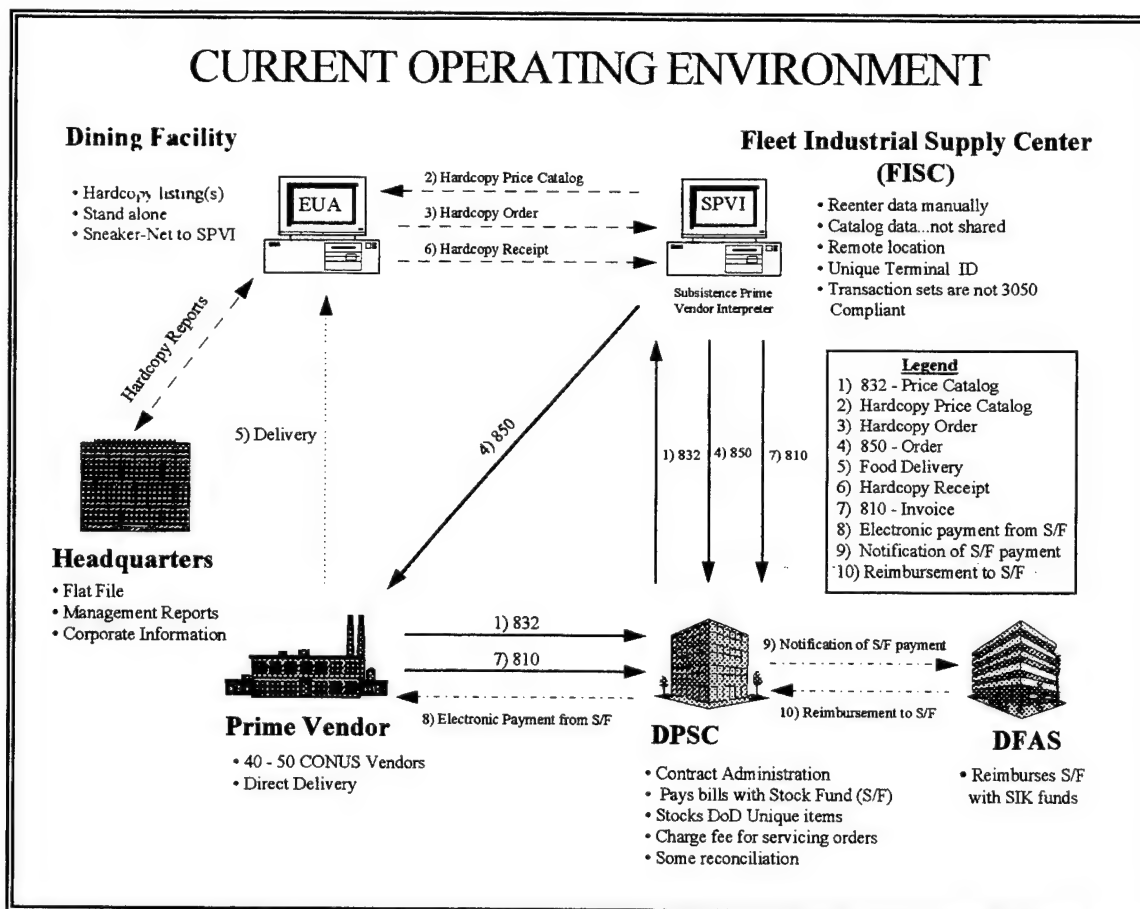
Prime Vendor provides a broader spectrum of more familiar, brand-name food labels than previous DPSC food inventories “bringing grocery store names into the military dining facilities” (Stefansky, November 1994 ). Vendors in the program can provide almost all peacetime garrison subsistence (except FF&V and items selected for continued supply be DPSC) direct to the dining facility. On Army installations, TISAs previously held approximately thirty to forty-five days of subsistence for all Dining Facilities. Prime Vendor reduces this amount to three days of supply for emergencies (winter storms, floods, etc.). During the Subsistence Prime Vendor test conducted in 1995, installation inventories for all Services reduced from a composite of 44.01 days of supply (DOS) to 5 DOS (Army and Air Force) and 8.75 DOS (Navy). This resulted in an estimated \$7,505,379 one-time inventory savings (Bryant, June 1996). Under Prime Vendor, the only rations which are exclusively held by DPSC are military-specific field and

operational rations (MRE's, T-Rations, etc.). These items are sent to installation TISAs based on projected field needs of supported customers (ACES Information Paper, July 1995; Prior, February 1996). In general, units that deploy to field locations for training are the customers of operational rations. These units base ration requests for operational rations according to the unit training schedule and quarterly training calendar. Long range predictions of field requirements are also given to the installation up to one year in advance.

The automation backbone of the Prime Vendor concept is the Subsistence Prime Vendor Interpreter (SPVI). Currently, each Service has unique methods for processing requisitions from dining facilities to DPSC. These methods contain varying degrees of automation and manual forms unique to each Service. The automation systems used by the Services cannot currently "talk" directly with vendor systems. SPVI provides a uniform DoD interface between distributors and each Service. The uniform interface allows the replacement of Service-specific forms and automation systems with a standard electronic transaction.

In essence, SPVI translates a Service's dining facility orders (generated by current systems) into a form that is understandable by the Prime Vendor's systems. The Prime Vendor requisition processing cycle with SPVI is outlined in Figure 2 (Caplan, January 1996; Yudiski, July 1996; Blanco, March 1996). The transaction with the vendor by SPVI conforms to Electronic Commerce requirements commonly used by the private sector. Electronic Commerce requirements outline a standard set of automated interchanges defined by Electronic Data Interchange (EDI) transaction sets to perform

functions such as ordering and billing. The requisition systems that have been integrated by SPVI (such as the Army's Army Food Management Information System-AFMIS) are peacetime systems. Each Service maintains additional, separate ordering systems for tactical rations and tactical exercises. Tactical ration ordering systems rely heavily on manual procedures and separate processes from peacetime subsistence requisition cycles. Theoretically, Service tactical requisition systems can be automated and designed to interface with peacetime automation systems, which will then communicate through SPVI to vendors (Fleming, July 1996). This concept will be further discussed in Chapter IV.



**Figure 2: Current Flow (Detailed), Numbers along arrows correspond to the EDI transaction set used (Source: LCDR Yudiski, NAVSUP, 18 AUG 96).**

The Direct Vendor concept of subsistence support is a modification of the Prime Vendor concept. In designated areas, vendors are contracted by the installation contracting officer through Blanket Purchase Agreements (BPAs). These contracts are locally controlled, managed, billed, and paid by the installation, in contrast to Prime Vendor contracts under DPSC control. The Defense Language Institute (DLI) is an example of such a contract arrangement and will be discussed in depth in Chapter III.

Direct Vendor contracts decentralize contract management and vendor selection, allowing installations to use multiple vendors, according to local command priorities, while satisfying Department of Defense food standards. While Prime Vendor contracts are efficient for large installations requiring large suppliers, Direct Vendor contracts efficiently accommodate the needs of smaller installations. This type of contract also allows smaller vendors to compete for business.

### **C. SUBSISTENCE PRIME VENDOR GOALS**

A GAO Report released on August 4, 1995 moved Subsistence Prime Vendor (SPV) into full swing. This GAO Report, and another completed previously in 1993, highlighted a growth in defense inventories in excess of \$60 billion between 1980 and 1988 (GAO/NSIAD-95-142, August 4, 1995; GAO/NSIAD-93-155, June 7, 1993). These inventories account for approximately 60% of defense spending. Overall, inventory levels have not decreased at a rate commensurate with recent force reductions (GAO/NSIAD-93-155, June 7, 1993). In 1995, GAO released a prepared statement to the House of Representatives specifically targeting \$77.5 billion in secondary inventory

items of which GAO maintains that \$36.3 billion is excess (Heivilin, March 1995).

Excessive inventory on-hand both prevents funds from being used for other purposes and is expensive to maintain. A reduction in inventory levels would allow more to be spent in operational and modernization efforts. Although the inventory levels highlighted by GAO are not just subsistence items, these items are widely seen as commercial goods that can be outsourced. It is hoped that outsourcing such commercial goods will result in lower costs through commercial competition.

The Department of Defense, for the most part, concurs with these GAO findings. In testimony before Congress on March 23, 1995 (Heivilin, March 1995), GAO referenced DoD's position on Business Practice Improvement across all commodities. GAO stated that the adoption of better business practices is essential to reducing infrastructure and poor inventory management. If at all possible, commercial goods and practices should be used to lower costs. This should be done through open competition or through the greater economies of scale and profit-focus of the commercial sector.

Prime Vendor initiatives are designed to enhance private sector involvement in the distribution and inventory functions of the Department of Defense. Both DoD and Congress are pushing for the integration of redundant and Service-common logistics functions into a centrally-managed, competitive business atmosphere. The integration of Service infrastructures would create consolidation of inventories, decreasing aggregate inventory levels required to meet demand requirements. Also, this integration would make it easier for Defense activities to interface with the civilian sector. The differing Service systems would be replaced by common methods and practices making contracting easier

and speeding transfer of assets between the Services. As Service infrastructures are integrated, certain functions that do not add "value" to the military mission can be eliminated from government control. These functions can then be transferred to the private sector where competition and substantial industrial bases can keep prices down, while improving response time to the end-user at a minimum risk to military readiness (Henderson, August 1996). Infrastructure consolidation and outsourcing of functions can allow the Services to shift more personnel and resources to focus on their primary warfighting task.

As mentioned previously, in the current DPSC system, Air Force, Army, and Navy installation warehouses cannot share subsistence stockage information. When installations are geographically very close, each installation may carry a duplicate inventory to that of neighboring bases. To compound this problem, each Service maintains separate ordering and requisition systems. These systems do not have the capability to directly communicate or exchange information. Therefore, even if inventory information were to be shared among installations in an effort to reduce redundant warehouse space or line items, there is no expeditious way to process requisitions from another Service and perform appropriate billings.

Subsistence Prime Vendor (SPV) is intended to eliminate this inherent redundancy. This will be partly accomplished by bringing in more sophisticated automated ordering systems from the private sector. At many sites (especially TISAs and dining facilities), inventories are maintained by manual calculations and requisition lead times (requiring prior notice of anticipated demands) of 30 days or more (Figure 1). For example, TISAs

require dining facilities to order 30 days in advance. TISAs then order from DPSC and receive the item at the date forecasted by the dining facility (30 days after requisition). This lead-time is caused by a lack of real-time, dynamic data flow between DPSC and dining facilities.

Incorporation of civilian inventory technology should reduce the on-hand inventories of food required by providing real-time demand data to vendors. As vendors become able to accept real-time demand data (through SPVI), they will assume the subsistence inventory responsibility from the government for all items except defense-specific combat rations. This allows the government to then eliminate jobs and warehouse space that is no longer needed. Additionally, Prime Vendor consolidates all Service demands in a region, eliminating overlapping installation inventories.

Incorporation of the private sector allows for faster delivery of foods, without the need for large inventories. Since real-time demand is used by vendor, SPVI had to be developed to allow the Services to share a common system interface with vendors. By adopting a common interface across all Services, adoption of industry-standard inventory practices, such as Efficient Consumer Response (ECR), using Electronic Data Interchange (EDI) can occur. ECR has been used in the grocery industry to allow suppliers to directly obtain demand data, allowing them to resupply the store more efficiently. Previously, the Services have been unsuccessful in developing such joint inventory control systems.

## **D. BENEFITS**

SPV, as well as Direct Vendor, capitalizes on the many benefits of commercial food distribution practices by reducing the logistics pipeline. The primary benefits are derived from: cost-savings in distribution and warehousing, inventory reduction, improved service, better quality, automation of manual operations, and decreased facilities expense. Additional benefits are gained through faster response times and the perception of higher quality through the use of household brand-names in dining facilities.

### **1. Cost Savings**

The major benefit of Prime Vendor is an immediate cost-savings. Although there is limited hard data available to quantify the savings, total cost-savings are predicted to exceed the fixed-fee cost of contracting with vendors. The program is expected to reduce DoD distribution costs at all levels because regional vendors will provide transportation to dining facilities. Prime Vendor substantially reduces DPSC and installation warehousing, thereby decreasing direct storage and handling costs. The diminished storage and handling requirements reduces workforce needs, ultimately saving money through personnel elimination. However, some personnel will need to be reassigned to contract management functions. The need to expand the contracting function limits the cost-benefit of warehouse personnel attrition. Cost-savings are also seen in procurement costs through the reduction in the DoD buying structure.



## **2. Time Reduction**

By reducing the “order pipeline” length, SPV allows customers to significantly lower inventory levels by relying on just-in-time delivery for food support. The reduction of inventory, both wholesale and end-use, will result in a substantial one-time savings. To draw-down inventory, DPSC and the Services will “eat” existing inventories to lower levels, minimizing waste.

## **3. Increased Responsiveness**

Prime Vendor tends to increase responsiveness because vendors reside in closer proximity to the customer. Regional vendors already have substantial distribution networks setup to satisfy existing civilian customers such as restaurants, hospitals, and groceries. Their substantial transportation network enables vendors to make multiple shipments quickly. Closer proximity of vendor warehouses also allows them to deliver fresher products more efficiently. Use of vendors has substantially reduced request-to-delivery time to a matter of days. (Allen, September 1996)

## **4. Quality Improvements**

Quality is improved because the customer can now select a broader range of products, including national brand-names, and receive fresher products. Quality can be defined as a low variance from customer expectations. One of the chief complaints with DPSC supply was in receiving “old” item (shelf-life extensions) and in getting only generic products. The customer now receives a larger selection of items, sizes, and brands while retaining the convenience of being able to place most orders from one source. The ability to select over a wide range of product brand-names, and prices, allows Dining Facility

Mangers more financial management flexibility and increases both the cooks and patrons opinion of the food items being served. (Stefansky, November 1994)

### **5. Increased Efficiency**

Electronic ordering through SPVI replaces manual forms preparation, thereby increasing efficiency in dining facilities. The development of electronic ordering also allows the Services to more closely conform to DoD Electronic Data Interchange (EDI) compliance goals. EDI is a standard transaction set used in private-sector commerce that allows proprietary automation systems to communicate. By adopting EDI, translation of data onto manual forms is eliminated. The decreased use of manual forms drastically reduces the overall administrative burden throughout DoD. Prime Vendor relationships also add flexibility to DoD order processes by allowing the use of telephonic order corrections to respond to sudden changes in demand. These telephone interchanges are conducted from the dining facility to the vendor, eliminating bureaucratic red-tape and increasing efficiency even more.

Military construction funds required to modernize, refurbish, or replace existing subsistence facilities may be sharply reduced. Planned military construction in other areas may be avoided if existing subsistence facilities are utilized in support of those requirements. If some of the buildings that had been used to store subsistence can be converted to other uses, it might be possible to cancel new construction projects. Also, some vacated facilities could be leased to other activities or government agencies to realize a gain to DoD.

## **E. CONCERNS**

Although there are many benefits gained with the Subsistence Prime Vendor Program, some concerns also arise. The following questions must be answered for Subsistence Prime Vendor to be a success: Will the vendors be able to effectively deliver to ships? Can vendors meet surges in demand without affecting operational readiness? How will the cost of subsistence change when DoD loses some control over initial procurement? Can the predicted cost savings be realized? Will the Services have an adequate number of trained food service handlers to deploy when needed? And, will commercial differences in packaging adversely affect operations? These questions will be discussed in following paragraphs.

An additional concern with the outsourcing of the subsistence function is created when the larger organizational context of the military is considered. While functions that are not providing value to current operations are candidates for outsourcing, it is possible that a key function that is providing a greater organizational competency may be outsourced. When this occurs it creates a "loose brick" in the greater organizational strategy that can be exploited by a competing nation. Often these "loose bricks" are initially misidentified as non-value added functions, but actually create a great structural weakness in strategy once they are removed. These "loose bricks" create opportunities for surprise as the organization loses visibility of the function. Therefore, careful selection and implementation of outsourcing must occur to prevent the formation of "loose bricks" in the overall operational strategy bulwark. (Hamal and Prahalad, May-June 1989)

## **1. Vendor Flexibility**

A natural concern for the Navy is the resupply of ships. Some Navy ships are deployed on short notice and may require larger than normal quantities at the last minute. There are also security issues inherent in delivering directly to a ship. The issue of whether or not the distributors would have enough food on hand to deal with short notice ordering is untested.

In general, peacetime, demand levels are stable and predictable. However, wartime demand will increase significantly and quickly. This shortfall has been addressed by the incorporation of "surge" clauses into Prime Vendor contracts. These clauses require contractors to be able to meet a specified surge level, but verification of this capacity is up to the contractor. Additionally, further research has revealed that these surge clauses allow the vendor to refuse to supply some or all items for overseas consumption. (Lydon, September 1996)

## **2. Higher Cost of Food Items**

Commercially-procured subsistence is going to cost more. Prime Vendors typically incur higher prices to procure than does DPSC. One element that contributes to this higher cost is the difference in the price of brand names as compared to generic items. (Office of the UnderSecretary of Defense (Logistics), 1995; Phillips, February 1995) The Defense Department is concerned that when it loses the ability to revert to a depot supply system, DoD may lose the ability to control prices. This could place vendors in a powerful position with an incentive for "price creep." Distributors have responded that they have to keep the costs down in order to compete for the government's business. I

have found little evidence that they would continue to be willing to match DPSC prices, if DPSC were to lose the ability to supply. Although food distribution is very nearly a perfectly competitive industry, vendors still have to work hard to match DPSC prices.

### **3. High Modification Costs**

At first glance, it appears that the cost of owning warehouses will obviously decrease, if not disappear, at some sites. However, this cost is partially offset by increased storage costs at dining facilities. Storage space at dining facilities was more efficiently used with DPSC's standard container sizes. Prime Vendor's less standard containers are requiring most dining facilities to expand storage area and to upgrade their storage racking systems. This is caused by the greater variety of sizes and types of commercial rations. Installations have also had to retain warehouse space to store operational rations used by units on field exercises and to store regular rations for emergency use as discussed previously. The only real differential cost-savings to DoD has been where freed warehouse space has allowed installations to avoid new military construction (MILCON) projects or to terminate building leases.

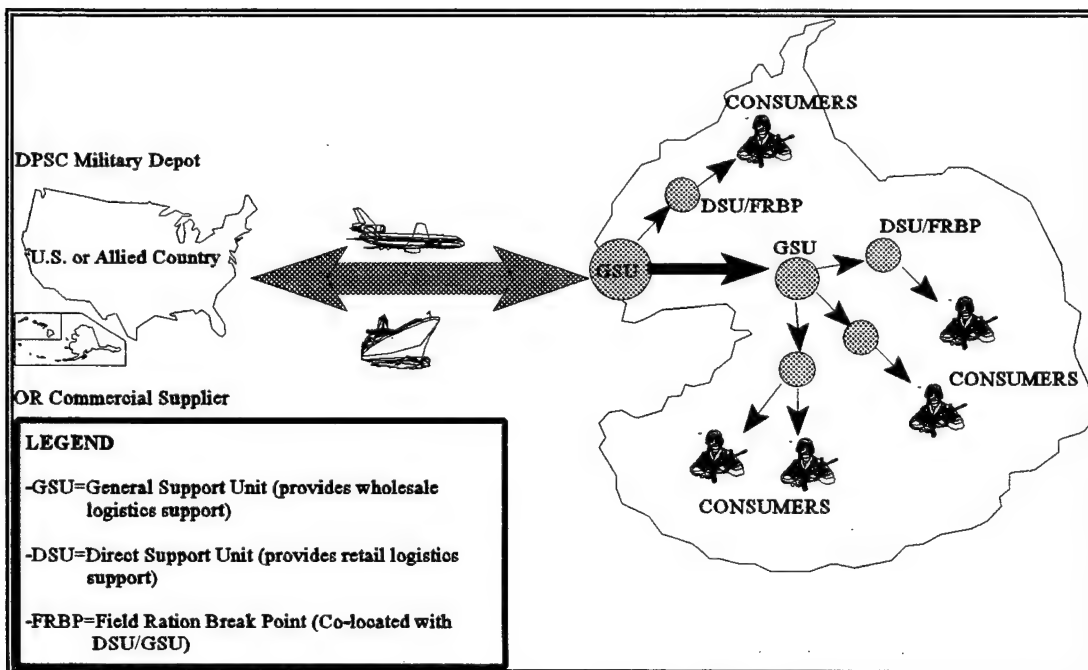
Subsistence Prime Vendor decreases warehouse personnel and material handling requirements. However, if employees are simply reassigned instead of eliminated, no real financial benefits are gained. In order to realize savings from decreased labor requirements, real attrition must occur.

### **4. Training Active Duty Food Handlers**

The issue of keeping Active Duty material food handlers trained must be addressed if Prime Vendor is to be used in contingencies. In peacetime, under the DPSC system,

food handlers often conducted training at TISAs and commissaries. Training of these food-handlers is difficult and the TISAs provided an excellent opportunity for exposure to all ration types in a controlled environment. The potential use of Prime Vendor in contingencies will require that the Services actively train these personnel on the handling, storage, inventory, and inspection of commercial food stuffs. The variety of packages, sizes, and types of commercial rations requires more comprehensive training. This has a direct impact on all land forces.

During field operations, subsistence is brought to a major staging unit as outlined in Figure 3. This unit represents the interface between the in-theater military distribution system and external commercial and other distribution systems. From this point forward, the Services need trained food handlers and food inventory managers. Documentation and



**Figure 3:** Simplified Ration Flow into a Theater of Operations.

training programs must be developed to address the issue of training for food handlers with commercial-type rations if Prime Vendor is used in contingencies. Currently, Services will still receive items from DPSC and DPSC personnel will do the bulk of the processing of any commercial rations used. It is at DPSC activities where items enter into the military distribution system and start to be tracked by military inventory systems. However, in a Prime Vendor scenario, the DPSC system will be bypassed, and rations will be delivered directly to FRBPs either through military or commercial transport.

### **5. Commercial Item Adequacy**

Prime Vendor-supplied items also often differ from DPSC items in packaging dimensions, designs, and requirements. This raises four key factors. First, to minimize cost, DPSC must relax its restrictions on items provided from the vendors. In some cases, the military is changing the requirements (such as container size, unit of issue, etc.) to allow the use of more commercial products. An example of this is the military use of three pound cans of coffee. Commercial vendors and equipment generally use two-pound cans. As a result, only a handful of vendors supply this size, and the coffee used is often of lower quality and higher price than that in the two-pound cans. DPSC has subsequently modified their requirements to permit the purchase of two-pound cans of coffee.

Second, many of the food service personnel are unaware of contractual specifications creating confusion when receiving deliveries. These personnel will have to be educated and trained on the changes to be expected in packaging. For instance, the contractor may substitute certain items of a different unit count to satisfy a demand. If the substitution is adequate for the intended use, the dining facility should not refuse the items.

Third, during interviews with the Industrial Preparedness Branch at DPSC, concerns were raised that many substitute commercial items may not provide the nutritional requirements needed for contingency rations. Military requirements are determined according to the Military Recommended Daily Allowance (MRDA). In garrison feeding, this is normally not a concern because of the variety and types of foods served. In contingencies, however, menu possibilities are more limited, and military rations have been specially fortified to accommodate this problem.

Finally, the commercial packages must also adhere to the Service's requirements in order to effectively build inventories designed for long shelf-life and packaging durability during deployed operations. Packaging must be durable to survive cross-country shipping, weather extremes, and field handling. Non-operational concerns must also be accommodated when making packaging considerations. A good example of this is the Navy's requirement for steel cans, as opposed to plastic jars, to meet environmental regulations for "plastics at sea." To accommodate those regulations and to make procurement easier, the Navy has plans to install "melters" on-board ships to melt waste plastic into forms that are easier to store and dispose of.

## **6. Inventory Benchmarks**

The inventory metrics used by GAO have been disputed by DPSC. Although the benchmarks GAO used are valid, they may not be accurately applied to DPSC. Inventory metrics quoted by DPSC (Faso, September 1996) are outlined in Table 1.

Although these rates differ substantially from the GAO findings, these findings are consistent with two commercial companies I interviewed for this study. Both Nestle



Foods and Purdue Farms (Hurley, March 1995; Braden, March 1995) reported inventory metrics that reflected higher efficiency and productivity than those reported by DPSC, but DPSC's numbers were still comparable. However, the calculation methodology is subjective and was not the same between DPSC, Nestle, and Purdue. Also, it is evident that GAO considered the vastly different technologies used by DPSC and the private sector, but did not provide any technology recommendations. The private sector has

	<u>Seasonal</u>	<u>Non-Seasonal</u>
<b>- <u>Dry Goods</u></b>		
Turnover Rate	once per year	4 per year
Demands	highly variable among items	highly variable among items
Days of supply on-hand	6 mos. ave.	1.5 mos ave.
Requisition ages	28 days	28 days
Days to procure	varies by item ave. 180 days	varies by item ave. 145 days
<b>- <u>Frozen (Freeze) Goods</u></b>		
Turnover Rate	once per year	8 per year
Demands	highly variable among items	highly variable among items
Days of supply on-hand	6 mos. ave.	1.5 mos. ave.
Requisition ages	15 days	15 days
Days to procure	52 days	52 days
<b>- <u>Fresh Fruits and Vegetables (FF&amp;V)</u></b>		
Turnover Rate	52 per year	52 per year
Demands	highly variable among items	highly variable among items
Days of supply on-hand	5 days ave.	5 days ave.
Requisition ages	2 days	2 days
Days to procure	1 day	1 day

**Table 1:** DPSC inventory metrics for subsistence categories. (Amato, 1996; Faso, 1996)

invested heavily in automation, while DoD has lagged behind with incompatible systems and practices among the Services. The lack of adequate communication links and compatible automation systems alone could account for DPSC's relatively poor showing.

The General Accounting Office (GAO) focused on end-state metrics to evaluate DPSC against the private sector. However, these metrics do not consider how changes in inventory culture (GAO/NSIAD-94-193) and re-engineering efforts may actually provide better savings than direct outsourcing. In conversations with Purdue Farms logistics personnel, the significant sunk cost of facilities often drives their out-sourcing decisions (Hurley, March 1996). Since DPSC and DoD already have a significant subsistence infrastructure, it cannot be assumed that outsourcing will provide automatic savings. (Hamal and Prahalad, May-June 1989; Hammer, July 1996; Markels and Murray, May 1996) In several cases, personnel involved with Prime Vendor have provided no concrete evidence of direct cost-savings, and have supplied "intuitive" knowledge that cost savings must be gained through outsourcing. It appears that infrastructure size is being used as an efficiency measure. Increases in efficiency will often lead to decreased infrastructure size, but decreasing infrastructure size does not always promote efficiency (Markels and Murray, May 1996). Process Centered Analysis and Velocity Management (Akin, January-February 1996) are two methods of analysis that should be used to drive efficiency decisions. Velocity Management reduces mass in logistics systems by replacing it with velocity (cycle times, turnover rates) and accuracy. Process Centered Analysis requires that the entire supply process be considered when seeking efficiency gains.

## **7. Asset Visibility**

The concerns raised with the current peacetime use of Prime Vendor are directly applicable to the potential use of this program during contingencies. In addition to the concerns detailed here, the issue of having direct visibility of a requisition and its supply status has yet to be addressed or tested. Despite numerous attempts to achieve Joint Total Asset Visibility (JTAV) across the Services and logistics disciplines (i.e. Supply, Transportation, and Maintenance), using Automated Manifesting System (AMS), Radio Frequency (RF) technologies, and Global Positioning Network/Satellite (GPN/S) technology, little cross-discipline integration has been achieved. This can mainly be attributed to insufficient funding to pursue the necessary integrating programs.

Although it is currently possible to see the location of a shipment, it is not possible in the military environment to get total line item detail on a shipment at the user's terminal. In other words, as a supply officer in a "retail" (Direct Support - DS) warehouse, I cannot sit down at my inventory management terminal, query an outstanding customer requisition, and have my system tell me exactly where my customer's item is. It is possible to do this through offline requests of the Logistics Information File (LIF) and by other time-intensive methods, but it is currently not possible to do this at retail supply outlets in near-real-time. This is especially true for requisitions that have passed over the interface between the military and civilian distribution systems. It is these concerns that will ultimately determine the success of the program. (Lorenzini, 1 Mar 94)

## **F. MEDICAL PRIME VENDOR; MODEL OF SUCCESS?**

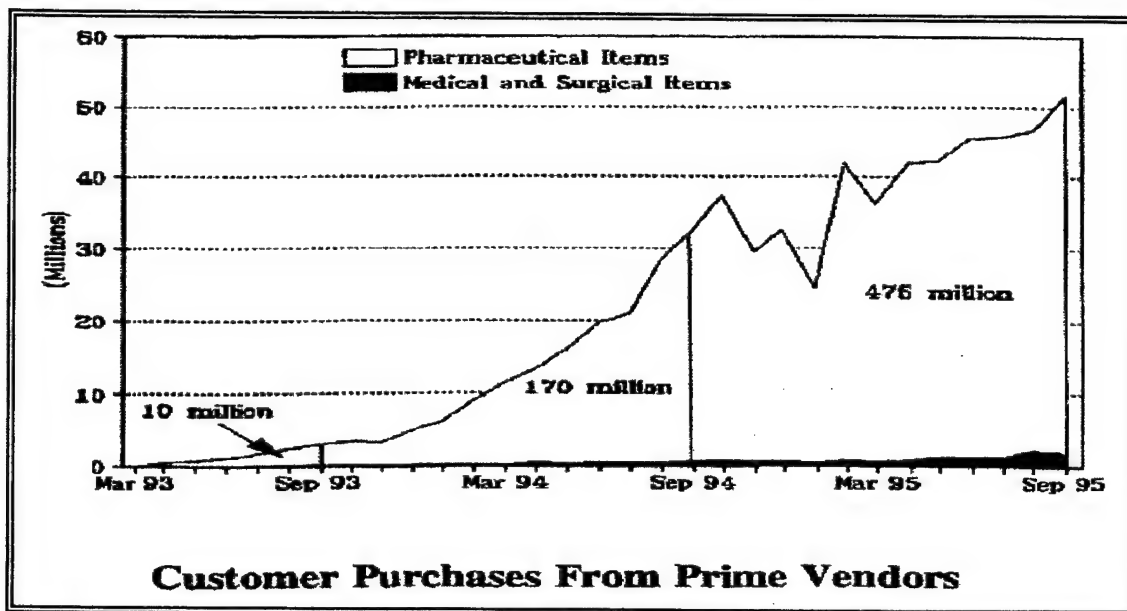
The original Prime Vendor Program concept was first implemented in 1993 at three military medical facilities in the Washington D.C. area. It has been documented as very successful. Because of its success, it has provided a vision and a "road map" for the privatization of many inventory functions, especially Subsistence Prime Vendor.

Since its inception, the Medical Prime Vendor Program has reported (DPSC, December 1995)

- |  |              |
|--|--------------|
| - Inventory reduction at DPSC depots               | over 90%     |
| - Inventory reduction at medical facilities        | over 64%     |
| - Reduction in disposal costs (expired medicinals) | over 99%     |
| - Surcharge reduction                              | over 69%     |
| - Annual savings due to decrease in pricing        | \$60 million |
| - Order ship time (previously 60 days)             | avg of 1 day |

Although impressive, the Medical Prime Vendor Program has not been without drawbacks. For example, while the use of Prime Vendor with pharmaceuticals has been extremely successful, the use of Prime Vendor in Med-Surg (Medical-Surgical) supplies has had mixed results.

As illustrated in Figure 4, the growth of orders from Prime Vendors for Med-Surg items is significantly trailing the growth of Prime Vendor orders of Pharmaceuticals. The rapid growth of orders in Pharmaceuticals clearly establishes the rapid acceptance of this program in this commodity. However, the sluggish growth in orders of Med-Surg items is



**Figure 4:** Growth in orders under Medical Prime Vendor (DoD IG Report 96-109, May 1996).

indicative of problems with supplying these items via Prime Vendor. This can largely be attributed to technical problems encountered with this specific commodity (Table 2) (Fescenmeyer, September 1996). Substantial differences in the industrial base have had tremendous impacts on the adaptation of these DPSC commodities to Prime Vendor.

Medical Prime Vendor is also plagued by a potential lack of visibility of products supplied by the vendor, once they would enter a military distribution system. In garrison,

<u>Pharmaceutical Industry</u>	<u>Medical/Surgical Industry</u>
Highly Regulated	Relatively Unregulated
Unique Numbering System	Multiple Numbers for Same Product
Item Identification Easy	Item Identification Difficult
20,000 Products	250,000(+) Products
Item Comparison Quick	Item Comparison Tedious and Slow

**Table 2:** Commodity differences in Medical Prime Vendor implementation.

visibility issues with pharmaceuticals are non-existent, however, distribution to deployed field hospitals in a foreign country is much more sensitive. In wartime, medical supplies are a uniquely commodity in that they do not flow through the "normal" supply network. Instead, a special system is used to expedite them to field hospitals and to provide maximum control. However, this system still relies on the existing military transportation system or couriers.

The Department of Transportation's (DOT) Volpe Center was working with the Services on a system to provide a "military-commercial" interface. This interface would allow visibility of the item from the vendor shop floor, through the transportation network, and finally into the military Total Asset Visibility network. Two programs were initiated, Vendor Express (VENEX) and Vendor Express - 2 (VENEX-2). However, Service interest and funding waned, and the program (VENEX-2) was idled. This system would have allowed DoD doctors to precisely follow the flow of critically needed material. VENEX-2 has the potential to be upgraded to "near-real-time" asset tracking, providing instantaneous information on the precise location of a shipment by line item number. This issue will be discussed in depth in Chapter IV. (Troup, July 1996)



### **III. SITE AND OPERATION ANALYSIS**

This Chapter will provide an analysis of Prime Vendor usage in both peacetime and in recent contingency operations. The review will cover the Prime Vendor trial "roll-out", two peacetime sites that are not completely under the Prime Vendor Program, and two contingency missions. Although SPV was not designed for contingency operations, it has been used in recent operations in a limited scale. Analysis of its use in recent missions provides insight to the applicability of Prime Vendor, as a primary means of support, to future contingency operations.

#### **A. SUBSISTENCE PRIME VENDOR TRIAL**

In response to GAO reports on DoD food inventories (GAO/NSIAD-93-110, June 1993; GAO/NSIAD-94-180, August 1994), DLA conducted a test in fiscal year 1995 of the Prime Vendor method in a four-state region (Alabama, Georgia, South Carolina, and Florida). They separated the area into five zones and awarded each zone a prime vendor contract. Prime Vendor was then phased in from December 1994 to April 1995 to allow for Subsistence Prime Vendor Interpreter (SPVI) installation and training (as previously discussed). (DLA-95-A30326, May 1995)

The initial cost savings looked very promising although DLA did not count personnel staffing or warehouse eliminations as savings. The test resulted in a savings of \$12.1 million, including the cost of developing and installing SPVI. The savings measured in the test were mainly from \$18.7 million in inventory reductions across all five



zones. Prime Vendor's hold inventory and their demonstrated ability to rapidly supply has lowered required installation and wholesale food inventory levels. (DLA-95-A30326, May 1995)

Transportation costs accounted for a savings of \$914,000 over a six-month period. The transportation savings were calculated by the reduced amount of transportation required from the DPSC wholesale level to the base warehouses. Prime Vendors deliver directly to customers, eliminating DPSC transportation expenses in these zones. Cost reductions as a result of the elimination of transportation from the base warehouses to dining facilities were not captured. (DLA-95-A30326, May 1995)

The Prime Vendor trial revealed the potential for substantial savings in warehouse space, personnel, and other direct costs. Base warehouses reduced their inventories during the trial, freeing 40 percent of subsistence storage space. Personnel requirements were reduced by more than 50 percent. Other direct costs were reduced by 40 to 55 percent. (Bryant, February 1996)

An interview with the customer service representative at Naval Station Mayport, Florida revealed that the customers are also very pleased with Prime Vendor. The ships unanimously concur that "... the quality has improved 100%." The Prime Vendor in Mayport, Beaver Street Foods, increased the variety of items available to the ships by 25 percent, adding many desired commercial products. (Hope, February 1996) In Mayport, only two of 175 deliveries were interrupted by the ships' schedule, and the base support activity was able to take receipt of the items for a later delivery (Faso, February 1996).

The test was considered such an unconditional success that DoD shortened the test period to six months, and went into full scale implementation.

## **B. PEACETIME SITE ANALYSIS**

### **1. The Defense Language Institute (DLI), Monterey, CA**

In contrast to Prime Vendor sites, the DLI has implemented a version of Prime Vendor called the Direct Vendor Program. The program at DLI has allowed contracted vendors to meet former DPSC price schedules on all contracted items. DLI's Direct Vendor Program has also consistently beaten regional Prime Vendor Programs on prices, especially with fresh produce (Prior, February 1996). The installation is currently contracting with six vendors (occasionally eight) and rates vendors based on three criteria: best value, ability to meet demand, and price. These criteria appear in the order of importance. Contracts are not awarded solely on low cost, but are managed according to a "Best Value" concept. "Best Value" allows the TISA to select a vendor based on Quality versus Price. TISA then selects the vendor that they believe is providing the best product for the quoted price. This has allowed the installation to meet all Department of Defense food specifications while maintaining low costs and increased flexibility. (Ramscoff, February 1996; Prior, February 1996)

This program is administered through Blanket Purchase Agreements with local vendors after they have documented their capability to meet the installation's contract requirements. It has allowed the installation to improve their public relations posture by placing contracts locally where possible. Because of the community link, the installation

has experienced reduced response and lead times when compared to some Prime Vendor Programs (Regional). Lead times have been reduced from 24 to six hours for regular order modifications and cancellations. Vendor response time has been decreased from prior day notice for emergency orders to a response time as fast as 20 minutes.

(Ramscoff, February 1996) Additionally, due to the unique nature of DLI, all warehousing and transportation functions have been transferred to the vendor saving approximately \$75,000.00 annually through direct and avoided costs. Previous cost savings for the DLI implementation approached \$750,000. However, the total cost computations for DLI savings have been complicated by the recent base closure of Ft Ord and neighboring training areas. These locations provided a significant demand sink for the previous warehousing activity (TISA) and the activity operated two additional satellite activities to support these locations. It is unclear how much the warehousing activity would have been reduced, even without a switch to Direct Vendor. (Ramscoff, February 1996)

The tight coupling of the installation to the vendor has also allowed the installation to emplace vendor EDI systems in the dining facility (specifically Kraft) allowing for near real time price updates and ordering by the centralized ordering personnel located in the TISA. The Dining Facility Manager places the order with the TISA, and specialized "commodity" personnel in the TISA select a vendor and place the order according to "Best Value." To further assist the Dining Facility Manager, two Quality Assurance Representatives conduct random sampling and quarterly inspections to ensure conformance to contract requirements. Monthly advisory councils and soldier exit surveys

are also conducted to provide customer feedback on food quality. (Ramscoff, February 1996)

## **2. Defense Distribution Depot, Norfolk, VA (DDNV)**

DDNV is a large distribution depot that provides the supply and logistic distribution functions to a majority of the DoD customers in the Virginia and Mid-Atlantic area, both ashore and afloat. In their subsistence division alone, DDNV supports more than 150 customer commands. The subsistence division currently employs 71 civil service employees and one military director. They have four subsistence warehouses containing more than 1000 stocked line items of subsistence valued in excess of \$16 million.

DDNV's Navy throughput alone is in excess of 5000 metric tons (MT's) each month, in addition to over 3000 MT's of other non-Navy requirements; clearly a large distribution operation. DDNV had not fully implemented Prime Vendor as of March, 1996, but will turn over approximately 40 of their shore customers to the program after an initially successful test period. Redundancy of business does not pose a problem here as the shore facilities are distinct and separate from the other activities being served by DDNV.

However, by working together, many benefits are being realized by this new relationship, as will be discussed below. (Park, January 1996)

Doughtie Foods has been awarded the contract to support these shore customers (zone 1: south, mid-Atlantic region). The \$19.4 million dollar contract addresses many service points, but there remain some concerns by DoD customers, particularly on service and readiness issues. The program appears to be quite successful thus far, however, as documented by the rapid growth of customers seeking Doughtie's services. Doughtie

Foods is a small business with less than 250 employees that posted over \$70 million in sales last year. The military contract will become a large percentage of Doughtie's business. Doughtie reports a gross margin between 10%-15%, and a bottom line of just 1%-2% profit. (Ratliff, February 1996) A primary advantage to this Prime Vendor support includes better service (48 hr order time versus a normal order notice required by DDNV of approximately 7-10 days). In terms of service, DDNV does provide approximately 22% of their business as "next day quick picks," which is comparable to Prime Vendor. However, the Depot usually requires a 7-10 day lead time.

A major assumption in implementing Prime Vendor is that the government distribution system cannot be competitive or cost effective due to unique support requirements. However, available data is limited to support that key point. The perception among program participants is that cost savings are being realized, but prior to DBOF accounting, DoD (and the Services) generally did not track all the economic costs of operating and maintaining the logistics infrastructure other than annual budgets and the associated payroll. Long-term cost savings above and beyond obvious immediate savings from downsizing are not known. However, there is potential for savings through the reduction of depot personnel and inventory through continued Prime Vendor expansion.

However, some issues and concerns surface with the use of commercial vendors. Although commercial food standards are high, the packing, packaging, and labeling of subsistence items are not consistent or sufficient for instances where inventory is still required. For instance, Navy ships are required to carry a minimum of 45 days inventory on board. This inventory ranges from \$100,000 on small ships to more than \$1 million on

large ships. The use of commercial rations eliminates standardized shelf-life markings, making subsistence receipts take longer, and causing periodic inspections to become more tedious due to administrative complexity. While the commercial sector is required to put standardized shelf-life data on food items, actual data placement and layout on cans, boxes, and containers vary greatly from manufacturer to manufacturer. As a result, shelf life and quality may become suspect, with rotation and inventory management becoming more difficult. One of the key advantages to Prime Vendor deliveries is fresh subsistence delivered "just in time" (JIT) for immediate consumption. However, military requirements often call for on-hand inventories to cover contingencies and long-term use requirements (such as a ship patrol). (GAO/NSIAD-93-110, June 1993)

Doughtie Foods can increase their business by only 25% of the contract amount for the year. (Ratliff, February 1996) This may pose a problem, as many other commands are looking to experiment with the new program and receive Prime Vendor support. As of March 1996, the vendor was only supporting a small percentage of the commands in the area that require subsistence support by the depot. If all DDNV supported commands participated in the program, it would call for an estimated Prime Vendor contract increase in excess of \$100 - \$120 million, well above Doughtie's capacity or the capacity of any single vendor in the area. Additionally, the issue of "peak service" requirements such as loading out an entire battle group for deployment, would be a significant surge requirement to a small vendor like Doughtie. To support the huge military market, multiple vendor's would be needed. Since this area was first researched, this is exactly what has occurred. The Norfolk area is now supplied by four Prime Vendors (Ford,

September 1996), and ships have been removed from the contract. Ship contracts will be handled separately from shore facilities, and DPSC is currently researching vendor ability to supply the remaining 23 military unique subsistence items ships require (Ford, September 1996).

Prime Vendors have agreed to start filling all of the depot's not-carried (NC) and not-in-stock (NIS) requirements from other military customers. (Ratliff, February 1996) In turn, the Navy has discussed transshipment alternatives with the vendor to ensure customers, particularly the customer afloat, get the high quality, flexible service required. Customers using Prime Vendor have expressed that service has been the main benefit, not necessarily cost-savings, over organic DoD subsistence distribution systems. The implementation of Prime Vendor in "steps" has been crucial to success in the huge Norfolk military market.

### **C. PRIME VENDOR IN CONTINGENCY OPERATIONS**

Officially, Subsistence Prime Vendor was started in 1995, but the concept of commercial resupply in contingencies has existed since the 1991 Desert Storm War in the Persian Gulf. In Desert Storm, commercial food items were purchased directly from food distributors, and shipped to military Field Ration Break Points (FRBP) in-theater. These food items were consolidated and packaged in-theater into Meals, Operational, Ready to Eat (MORE). This method of procurement has largely been considered a failure partly because of difficulty in properly configuring nutritionally adequate ration modules. (ACES, September 1996; DPSC, September 1996).

The MORE ration concept consisted of procuring heat and serve "Top-Shelf®" and similar brand-name food items directly from the commercial sector and combining them at the FRBP into a complete individual meal. Although this concept is the first widespread modern use of commercial rations in a contingency, it is beyond the scope of this research, and will not be addressed in depth. Instead, this section will discuss operations that have occurred since Prime Vendor has been in operation, and will only reference Desert Storm Lessons Learned.

### **1. Haiti Support**

In September of 1991, the elected president of Haiti was forced into exile. As a result, many Haitians fled the country and were picked up by the U.S. Coast Guard and transported to Guantanamo (GTMO) Bay, Cuba. During the refugee period leading up to the military intervention in September 1994, Prime Vendor support of refugees in GTMO, or of the military operation in Operation Uphold Democracy, was never officially used. However, subsistence supplies were obtained from the regional Prime Vendor supplying Florida in the South East region. (Lydon, September 1996; GAO/NSIAD-96-38)

Though Prime Vendors were used, they were not the primary means of support. Current Prime Vendor contracts limit the government to obtaining subsistence for Continental United States (CONUS) delivery only. Vendors are not required to supply rations for overseas locations or customers. However, during the Haiti crisis, the Prime Vendor did provide one million pounds of rice to Jacksonville for delivery to GTMO (DPSC, September 1996). This rice was used to feed the civilian population and provided a basic, limited menu to refugees and the civilian population of Haiti. During the



following occupation of Haiti, similar techniques were used to deliver food from commercial vendors to deployed forces. Food distribution and supply was complicated by inadequate food service/distribution planning prior to the commencement to Operation Uphold Democracy (Richard Harsh, ACES, September 1996). Once vendors were given a food order, and time to react, they were able to deliver to the designated shipment points on schedule. (DPSC, September 1996)

Haiti became a proving ground for subsistence Total Asset Visibility (TAV) experiments. In this operation, Radio Frequency (RF) tags were used to track shipments of supplies moving into Haiti and through the distribution system. Subsistence supplies shipped from both Aerial Ports of Debarkation (APOD) and Sea Ports of Debarkation (SPOD) were tagged and tracked to using units. This provided leadership with instantaneous visibility of where food shipments were, what type (MRE, A, B, etc.), and how long they had been sitting in a location. The ability to see these shipments allows the commander to time demand with supply flows. (Barnes, September 1996)

The purpose of the TAV trial was to prove tracking and management technologies. With subsistence, the goal is prevent the problems found with subsistence supplies in Desert Storm. During Desert Storm, food arrived haphazardly at supply points, creating situations where soldiers did not have access to any variety in menu or type of rations. Inventories also had the tendency to build as single menu items. For example, soldiers complained of getting the same meal for many days or weeks in a row.

At the end of Desert Storm, the inability to view the entire supply pipeline and "on-ground" aggregate inventories resulted in an estimated \$2.7 billion in serviceable turn-

ins alone (Barnes, October 1996). Firm figures are not available but approximately \$8 million dollars of excess subsistence items also accumulated (Prior, October, 1996). The reason for the accumulation of subsistence is disputed, i.e. the conflict was too brief, (Prior, October 1996). Most of this inventory was subsequently given away in Provide Comfort, transported to other areas, diverted enroute, destroyed (if damaged), or remained in place in Southwest Asia. (CASCOM, September 1996)

Haiti was the first major use of technology aimed at preventing logistics inventory growth and at being able to track specific shipments. Data provided by the interrogation network and tag data enabled soldiers to locate specific shipments of rations. (Volpe Center, December 1995)

## **2. Bosnian Peace-Keeping Mission**

Subsistence Support in Bosnia has been primarily through the use of military rations and contracted Logistics Capability (LOGCAP). LOGCAP differs from normal Prime Vendor in that LOGCAP replaces an entire military function with a civilian contractor. Prime Vendor, on the other hand, is a contract for only a portion of the logistics function. While Prime Vendor shipments to Bosnia have not been officially used, the supply of subsistence from commercial vendors is occurring. In Bosnia, a commercial contractor has been providing complete subsistence support for rations (other than military operational rations). In order to avoid the inability of the commercial and military distribution systems to talk directly, the contractor is serving as a "bridge" to fill this gap. The contractor is responsible for aggregating ration demands and forwarding them to food suppliers. This support is very limited in nature, and generally consists of FF&V, dairy

products and breads. Some perishable, semi-perishable and B-ration (canned) items are also supplied using this method.

Contractor support in Bosnia has been seen as effective by DPSC. However, the support is expensive and is being terminated by DoD due to rising costs of LOGCAP support (GAO-NSAID-96-204BR, July 1996; ACES, September 1996). Once this contract is terminated, supply support will revert to the military. Long term implications of the switch will be minimal since the contract will be terminated at about the same time as forces are due to redeploy from Bosnia (currently forecasted as December 1996). Ration support will most likely revert to standard operational rations (B, T, MRE) eliminating the concern of the handling of commercial rations in the military distribution system. However, current supplies of operational rations are dwindling and industry has had the benefit of time to get prepared to supply these rations. This point will be discussed in the following section on Unitized Group Rations and current contingency plans.

In Bosnia, the use of TAV to track shipments has been expanded from the level used in Haiti. At a presentation conducted in Fort Lee, VA, the CASCOM Battle Lab demonstrated that the current system can show not only that tagged items have been shipped, but can also show full detail on the contents of the shipment, supply flow between RF tag interrogators, number of tags inbound, ages of tags at choke points, and aggregate numbers of tags at a choke point.

The technology is very exciting, and when coupled with ration supply, can provide the ability to manage subsistence shipments as "moving inventory." Not only can

commanders see where shipments are they can see what shipments are where, what is in the shipment, and where it is going. Once a shipment is marked with an RF tag, that shipment becomes visible to the military system by way of an interrogator located at key points along the distribution pipeline. In Bosnia, these points have been airports, sea ports, bridges, and military supply units.

However, one problem with tracking subsistence in Bosnia has surfaced in the creation of source data. To create a tracking tag, the data entered at the point of shipment must be accurate and encoded in a compatible format. Shipments coming from commercial vendors were not tagged and were thus "invisible" to current Army asset tracking systems. Shipments sent first to military depots were tagged, but if the item was not first in inventory, source data had to be entered "on-the-spot" and suffered from a lack of completeness and accuracy.

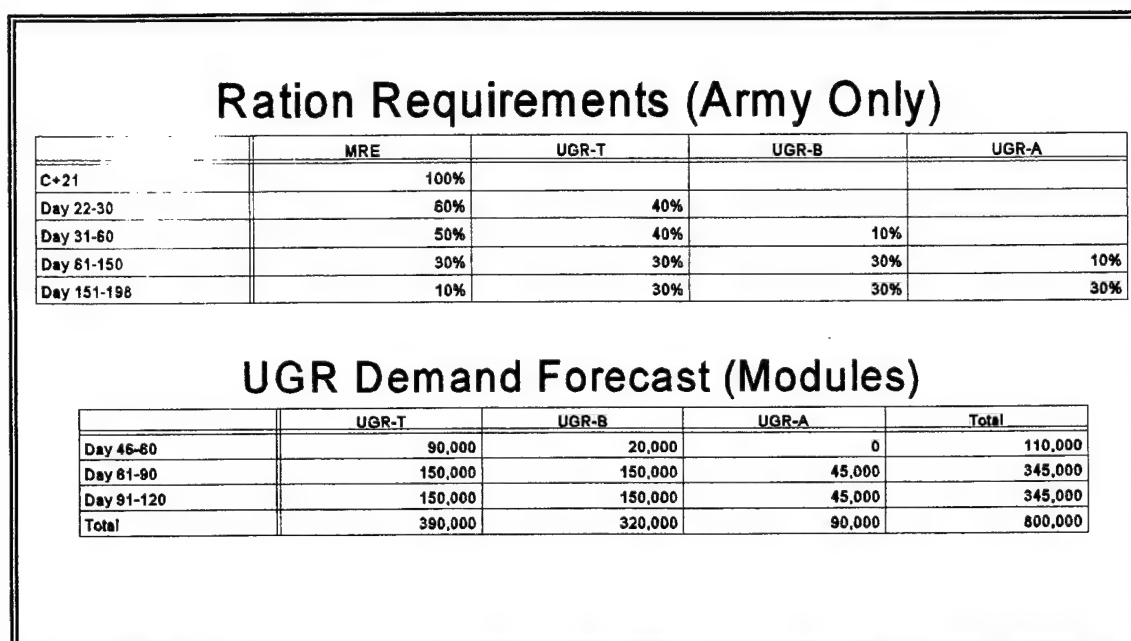
Contractor support of rations in Bosnia did not suffer from this same problem. The contractor controlled both ends of the supply pipeline and was not constrained by where rations were purchased. Although this situation was advantageous, it did not allow military commanders much flexibility in what was supplied. In essence, the contractor could "see" his inbound supplies, compare them with projected demand, and force his internal system to compensate for discrepancies. However, placing this responsibility exclusively on contractors has proven to be prohibitively expensive. (GAO/NSAID-96-121BR; GAO/NSIAD-96-204BR)

LOGCAP contracting for the subsistence function in Bosnia is effective but is also expensive. Military perishable subsistence platoons exist in the force structure that may

have been able to perform this function at a lower cost. By not using military personnel in the resupply of rations, long-term recommendations and suggestions for improvement are restricted to contractor input. Also, by not using military units in the field, training requirements for military personnel are harder to quantify and recognize. Fuller understanding of the military and commercial role, coupled with better total cost data, will help better define what future roles and missions are best suited for military or LOGCAP support.

#### IV. PLANNED CONTINGENCY OPERATIONS

This chapter will discuss the Unitized Group Ration (UGR), the T-ration, the B-ration and the A-ration meals. Army contingency plans call for the heavy use of operational rations, specifically MRE's, early in a conflict with a rapid transition through the ration families (See Figure 5). The MRE and other special Operational Rations are designed for use under special operational conditions. Special Operational Rations are



**Figure 5:** Wartime Feeding Plan. C-date is contingency start day. Percentages reflect meals served of a given ration type. (Chester, September 1996)

entirely military-specific and do not meet the criteria for Prime Vendor supply as discussed in this thesis. The Army plans to replace T-rations, B-rations, and A-rations with the

UGR. However, these older ration types had some benefits and disadvantages that must be addressed with the introduction of the UGR (Figure 6).

#### A. UNITIZED GROUP RATION

Currently, the main operational ration that will be used (initial configurations are now being tested) by the Army is the UGR. It is broken into 3 distinct types of rations. In general, it consists of a unitized portion containing all components required to make one complete meal for 100 soldiers. The only separate items handled are the entree for the UGR-A, enhancements (e.g. extra spices), and supplements (e.g. milk and bread). The entree meal is what generally distinguishes the three types of UGR. For the UGR-B, the

RATION COMPARISON*					
	UGR-A	UGR-B	UGR-T	T-Ration	B-Ration
Shelf Life	18 mos.	18 mos.	18 mos.	12-36 mos	varies (yrs)
Configuration	4 meal modules per pallet (same menu)	4 meal modules per pallet (same menu)	4 meal modules per pallet (same menu)	12 18-meal modules (same menu) per pallet	2 breakfast and 2 lunch/dinner meals per pallet
# meals/pallet	400	400	400	216	400
Preparation	Refrigeration, food preparation, and cooking	Food preparation (including re-hydration) and cooking	Heat, or add water, and serve. Container is the serving vessel	Heat, or add water, and serve. Container is the serving vessel	Food preparation (including re-hydration) and cooking

\*"A" ration is not included due to variety of ration and non-standardization.

**Figure 6:** Comparison of rations by type (FM 10-23, April 1996).

entree would be a dehydrated or semi-perishable food item, a UGR-T entree is "heat and serve" in a special can, and the UGR-A entree will be a frozen or fresh item. A major purpose of this family of rations is to use quick-prepared and/or ready-to-use commercial products. By using readily available commercial food items when possible, demands on the industrial base for military specific items is reduced, and the resupply of these items becomes less expensive and faster.

The UGR is designed to simplify and streamline the process of providing high quality meals in the field by integrating and standardizing components of the older A, B, and T ration meals. The UGR develops a standard product (A, B, and T configured alike) for use throughout the battlefield and uses off-the shelf components (e.g. instant gravies) to speed-up meal preparation.

The UGR is tentatively planned to be a depot-packed, modularized ration that reduces the number of line items handled by ration activities and significantly reduces the chance of not having a needed item on hand. This ration can only be used when organized food service facilities exist in the field (Chester, Tray-Pack Industrial Preparedness Measure September 1996). The "unitization" of the meals expedites handling of the ration and ensures that field kitchens are issued complete meal sets at FRBP's. (FM 10-23, April 1996)

Currently, the Army is the only Service with plans to use the UGR. The Marine Corps has made plans to continue use of the older B-ration and T- Ration meal. This break in common feeding plans comes as a result of the relatively short shelf-life of the UGR as noted previously in Figure 6. Although the UGR-B and UGR-T ration have



shelf-stable entree and main components, the unitized portion of the ration has components that expire in 18 months, thus effectively limiting the shelf life of the ration to 18 months. Previous generations of the B-ration and T-ration did not share this problem. The meal modules were more shelf stable but required supplementation and did not come pre-configured into "complete meal" modules. (DPSC, September 1996)

## **B. THE TRAY-PACK (T) RATION**

The Tray-Pack Ration is essentially similar to the UGR-T ration except that it contains only core components and is configured to modules that support 18 soldiers. These modules contain the main portion of the meal, but require supplementation at the FRBP to constitute a complete meal. Current peacetime demand for the T-ration has been very low and has prevented adequate expansion of the industrial base beyond the core suppliers of MRE's and other operational rations. Low peacetime demand has also caused the number of T-Ration suppliers to shrink. The key component of the T-ration which makes it military-unique is the packaging of the special can housing the entree. Although the entree has been prepared according to military specifications, the preparation of the entree is not difficult within existing commercial capability. However, the can body and lid are unique and represent the logistical choke-point in the supply of this ration.

(Chester, Tray-Pack Industrial Preparedness Measure, September 1996)

### **1. Logistical Choke-Point**

Production of the T-Ration (and UGR-T) depends heavily on the supply of can bodies and lid bodies. The required can is used by two or more Services, i.e., those that

use the T-ration or UGR-T, typically has low peacetime but high wartime requirements, and is critical to current Service field feeding plans. This particular can, while being military-unique, has a limited shelf-life and production base of one manufacturer. Shelf-life usefulness is determined mainly by protection from environmental variables such as humidity (corrosion), infestation (sanitation, microbiological growth), and temperature (warping, cracking) and not a set time frame. To sustain production, the Army originally had forecasted a 10 million Tray-Pack can peak demand. The highest actual demand in peacetime has only reached a supply of 3 to 4 million cans, and current plans only call for a consumption of 600,000 cans. (Chester, Tray-Pack Industrial Preparedness Measure, September 1996)

## **2. Production Shortfall**

The Army has projected a demand of 7.98 million cans across 150 days of a mobilization. This demand cannot be met by the current supplier, Central States Can Company. Central States can only produce 3.042 million cans in the same period. This shortfall in capacity does not reflect Marine Corps requirements. The Marine Corps also depends heavily on this component for the production of the existing T-ration meal. Currently, no funding exists to provide for an inventory of cans or can components to offset the shortfall. Installation of a second production line to expand capacity in a contingency would require 120 days, and Central States has not committed to sacrificing production floor space used for commercial customers. However, Central States is willing to maintain the current line because it is still generating a profit. (Chester, Tray-Pack Industrial Preparedness Measure, September 1996)

### **C. THE B-RATION**

The B-ration primarily consists of semi-perishable items in cans. In the current Army 10-day menu, approximately 100 different food items are used. This ration was originally designed to provide breakfast, lunch, or dinner when it was not possible to resupply using perishable foods. The ration substitutes for perishable items on an item-by-item basis. (FM 10-23, April 1996)

The B-ration is stored in a unitized form in 100 soldier sets at DLA warehouses. Current DPSC plans call for the elimination of all inventory stocks and the conversion to a "just -in-time" (JIT) inventory control system. With JIT, vendors provide direct delivery of supplies to demand locations, eliminating intermediary inventories. Commercial items also will be substituted, where possible, for all B-ration items. Previously, B-rations were defined by military specification. However, through the experience gained by Prime Vendor, all but 36 items can be directly substituted with a commercially-available item. This concept is identical to the Prime Vendor system used for peacetime facilities and installations except that Prime Vendors currently do not unitize meals according to a pre-defined headcount (such as 100-soldier modules). (DPSC, September 1996)

The UGR-B will replace the old "unitized" B-ration, and will incorporate the commercial items now available. Commercial items will flow from food distributors into a "unitization point" where all the components will be packaged into a complete 100 soldier module. The modules will then be palletized according to meal, and shipped. Currently,

no War Reserve funding exists for pre-positioned stockage or inventory for this ration type. (DPSC, September 1996)

### **1. Unique Components**

Studies are underway by the DPSC to determine the ability of vendors to supply standardized B-rations (Blaney, October 1996). The ability of the vendors to supply the standardized B-rations should be sufficient, but these items must be thoroughly cross-referenced and cataloged against the previous B-ration listing. The possibility of sourcing these items through the commercial sector has not been validated since 1989; however, these items are generally consumed in the private sector. Nevertheless, 23 items require special packaging to conform to U.S. Navy requirements. These items differ from their commercial counterparts in packaging only. An additional 13 "peculiar" (military-only) B-rations are required by the Services. These items are dehydrated and do not generate peacetime demands. (Blaney, October 1996)

An interesting fact influencing the use of commercial B-rations is that while the grocery distribution system is highly-standardized, wholesale food distributors are not. While the grocery industry makes widespread use of standardized sizes and bar coding, food distributors have generally standardized can sizes, but not their bar coding mechanism. In essence, this means that there could be two identical cans, but with different bar code information (if present at all). Subsequently, the military cannot rely on the current bar code technology used in the commercial wholesale sector until it becomes more standardized. The food distribution industry expects that to occur somewhere around 2005 (Ford, September 1996).

## **2. Differing Service Configurations**

Each Service is currently planning to use a different configuration of the B-ration meal to support the DoD contingency plan. The Marine Corps will continue to use existing unitized or loose B-rations, while the Air Force will use "loose" B-rations. "Loose" B-rations are B-rations that have been palletized and shipped by item in no particular menu or meal configuration. The Army is the only Service with plans to use the UGR-B.

### **D. THE A-RATION**

A-rations include both perishable and semi-perishable food items. Perishable items require refrigeration and increased fuel, equipment, water, and preparation requirements. Introduction of this ration into the feeding plans in a contingency requires the fielding and use of extensive refrigeration assets. Current and projected force structure is not configured to adequately support the total requirement expected in the present contingency plan of two simultaneous medium regional conflicts (MRC's). The bulk of refrigeration support will most likely come from the use of host-nation support, local purchase, or use of refrigerated shipping containers and ice chests. (FM 10-23, April 1996)

A-ration meals have generally been configured according to menus based on the availability of rations and the necessary support equipment. Typically, A-rations are not predefined or configured, and rely primarily on a mixture of other ration types previously discussed, mixed with a perishable entree. The UGR-A ration will attempt to standardize

this ration by providing a standard meal module minus the entree. The "trick" to this type of configuration would then consist of timing the supply of the perishable entree with the delivery of the remaining meal module (DPSC, September 1996). In previous conflicts, when major meal components were separated, they often did not arrive simultaneously or even at the same location. According to DPSC, "in Desert Storm, they were unable to marry up flameless ration heaters with MRE's in the right place, at the right time" (Viola, October 1996).

#### **E. JOINT TOTAL ASSET VISIBILITY (JTAV)**

Asset visibility in military shipments has been an ongoing concern. Each Service, as well as private sector companies, has implemented various technologies to enable more efficient management of supplies flowing in transportation networks. A workshop held July 20-22, 1994 by the Technology Committee of the National Defense Transportation Association outlined four focus areas of concern:

- Capturing Information on Direct Vendor Shipments
- Overall Process Improvement and Compliance
- Implementing Multiple Automated Identification Technologies
- Standardized documentation and labeling

These focus areas form a crucial portion of the JTAV effort achieve "Battlefield Integration." These areas represent convenient way of categorizing a variety of problems that were identified by military, commercial and government participants with current

operating methods. By implementing these focus areas, concentrated effort can be applied to further improve existing processes. (Technology Committee, September 1994)

### **1. Battlefield Integration**

JTAV efforts incorporate each Service's asset visibility efforts under one umbrella to promote inter-operability. Each Service manages food differently, and current Service systems cannot effectively interface with commercial inventory or ordering systems.

JTAV seeks to overcome Service "stovepipes" for supply visibility and open supplies/inventories to all Services. By opening inventories to wider visibility, demand patterns can be better visualized, and duplicate items can then be consolidated to provide better economies of scale with reduced duplication.

### **2. Army Efforts**

In an attempt to cut down on manual order processing, the Army is developing a standard food ordering system. This system will interface with the systems presently used to place orders in the field. By tying the requisition processing into existing systems, Army units will now be able to track food requisitions in the same system being used to track all other supplies. All orders for food in the field are processed manually according to the Army Field Feeding System. FRBPs receive the orders and also keep manual records. Automation of the Army's food requisition and tracking system is currently non-existent.

Army efforts will integrate order processing through the Unit Level Logistics System (ULLS). In garrison, orders are processed via the Army Food Management Information System (AFMIS). As previously discussed, the Subsistence Prime Vendor

program has provided interfacing with commercial vendors via the Subsistence Prime Vendor Interpreter (SPVI). However, no such interface currently exists for integrating military field ordering systems with the commercial sector. AFMIS "...was not designed for, and will collapse" (ACES, September 1996) if it is used for field ordering. AFMIS is a strong system for what it has been designed to do, but it has been modified many times and has been developed along a completely divergent line from the tactical distribution system. As a consequence, it would take less resources to develop automated capability in the tactical system than to attempt to further modify AFMIS. Emplacement of AFMIS in the field would also entail the establishment of duplicate ordering systems (AFMIS and ULLS side-by-side) or the design of another interface to provide data into the tactical supply system from AFMIS.

### **3. Interfaces with the Commercial Sector**

As previously discussed, little "true" asset tracking capability exists between the military and commercial vendors. Some inroads have been made in ordering systems, but these systems generally have not provided a total view of the supply transaction from "birth" to "delivery." In interviews with Nestle Foods and Purdue Farms, they noted that while they have extensive visibility over what is in their organic distribution system, little information is freely exchanged with third-party freight forwarders. In some cases, other companies, such as Wal-Mart, have overcome these barriers by forcing "upstream" suppliers to adopt their distribution and ordering systems. Inter-company interfaces such as those that exist at Nestle and Purdue are similar in nature to the differing interfaces between each Service and of the Services with the commercial sector.



Purdue Farms values instantaneous data on each shipment as indicated by their high degree of investment in satellite tracking systems and the mobile networking capabilities of their organic fleet. For example, Purdue managers can find out where (within 100 meters) a truck is, what its speed is, and the temperature of its cargo at any given time. Any problems with the shipment or route can be coordinated with the driver in the cab via fax or cellular phone. With third-party freight forwarders, some have similar capabilities, but the two systems have not been integrated. (Hurley, March 1996)

Purdue Farms is trying to establish better data links with transportation companies, but while some are open to the notion of instantaneous data exchange, others have no intention of pursuing this kind of relationship. As a result, Purdue Farms' distribution control personnel have to coordinate "off-line" with transportation company personnel to determine actual shipping status. Purdue Farms intends on cultivating the ability to interface with third party systems directly to provide better control, waste less administrative time, and enjoy a more dynamic relationship with their business partners. (Hurley, March 1996)

Nestle Foods has initiated a vendor managed inventory program with Lucky Foods in an effort (by Lucky) to reduce warehousing and distribution costs. Nestle monitors their inventory levels at Lucky central warehouses and replenishes them as necessary. This allows Nestle to keep Lucky's turnover rate for Nestle Products high at 52 times a year. Actual demand patterns are transmitted daily to Nestle from Lucky to build accurate forecasts and demand patterns. Nestle makes inventory decisions for Lucky and has managed a 98% customer service level at all times. This has benefitted Lucky with fresher

products, higher customer service levels, lower warehousing costs, and increased velocity of product through their warehouses. When Lucky was managing their own inventory and using more conventional supplier relationships, they were only obtaining about 20 inventory turns a year. The ability to rapidly turn inventory allows the company to keep smaller inventories on hand, reducing inventory carrying costs. (Braden, August 1996)

While Nestle has established a dynamic data link with Lucky, the data relationship is not perfect. While Lucky can "see" what is in their warehouse, they cannot see projected inbound shipments or "upstream" supply status in Nestle Warehouses. This relationship also creates a loss of control for Lucky, now that inventory decisions are made by Nestle. In addition, some problems with billing have occurred with regards to pricing. Occasionally, some Nestle customers may have received special offers from Nestle marketing personnel, but the Nestle distribution activity may be unaware of the new price. Nestle's Marketing Division data is not linked to their Distribution Division and pricing information is not shared. Subsequently, Lucky pays only the Nestle Marketing agreed upon price and not Nestle's Distribution expected price, creating some administrative difficulty at Nestle's Customer Service. Most of these problems can be attributed to incompletely linked inventory, marketing, and distribution systems, that communicate the required data elements instantaneously to each key stakeholder. (Beebe, August 1996)

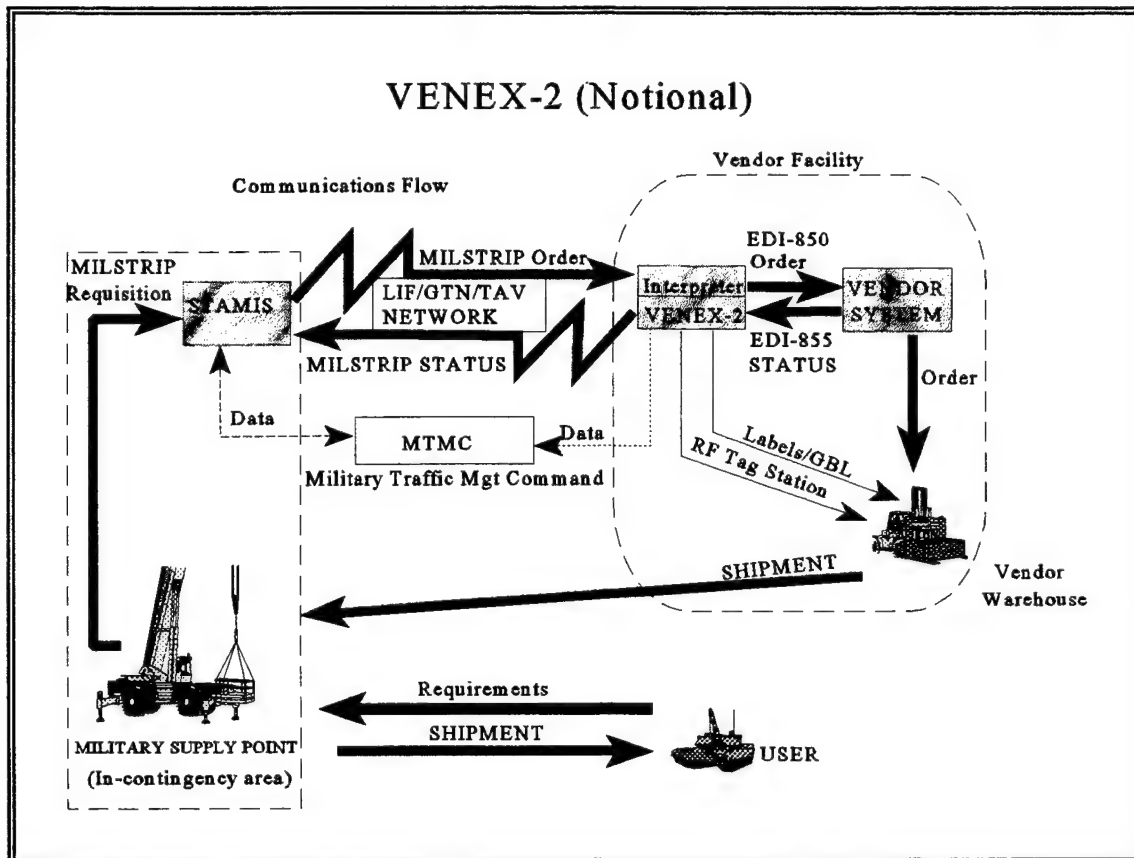
#### **4. Vendor Express - 2 (VENEX-2)**

VENEX-2 was originally designed to overcome program shortfalls in the Medical Prime Vendor Program. It was specifically designed in conjunction with the Department

of Transportation to rectify problems with requisition/supply visibility in a conflict. (Popielis, September 1996) VENEX-2 is an outgrowth of a program called Vendor Express (VENEX) that was initially started in 1994 to facilitate the commercial resupply of medical material by producing automated Government Bills of Lading (GBL) for the vendor. (Vendor Express System Master Design, October 1994)

Under VENEX, one shipment comprised of many orders is assigned only one shipment number or Transportation Control Number (TCN) and contains no record of individual orders. Although individual order data is retained in the vendor's system, shipments do not "carry" their own order-level identity. Data on items contained within the shipment itself, must be retrieved "off-line" from the vendor's own internal system. VENEX-2 extends this capability by allowing the shipment data to also indicate what individual orders are being carried within a given shipment or TCN by query of the existing Global Transportation Network (GTN). GTN is basically a worldwide system that provides shipment visibility. TAV expands on this system by adding line item detail.

Initial VENEX-2 plans called for developing a system that will provide shipment data to the GTN (or TAV network), however, no clear guidelines were established on the level of detail that would be provided. It is possible, though, to modify VENEX-2 to be able to provide data to the GTN (see Figure 7), allowing detailed order shipment data to be queried by the user. In fact, establishing the interface with vendors has been more difficult administratively than technically. The technology exists in both data formatting and hardware to accomplish the necessary tasks. However, early identification of vendors must occur to ensure that interfaces can be written, the necessary software and hardware



**Figure 7:** Notional VENEX-2 flow. GTN/TAV/LIF databases would receive continuous data feedback on shipment location via radio frequency interrogators along shipping route and at major “choke points” such as bridges, airports, and sea ports. MILSTRIP transactions are military-unique standard information sets. (Popielis, September 1996)

can be integrated into the vendor’s local area network (LAN), and personnel training can be conducted. (Troup, August 1996)

Using VENEX-2 in a modified form to input detail data into the GTN is intriguing. The system can effectively turn the interface between the military and commercial sectors into a more dynamic environment. Integration of a standard computer directly into the vendor’s distribution management system allows the vendor to more rapidly receive orders and the military to receive almost instantaneous shipment data. The implication for this is

that it becomes feasible for a food handler in an overseas conflict zone to query their local Standard Army Management Information System (STAMIS) computer and receive immediate information on the shipment status of a particular ration requisition. The envisioned Battlefield Distribution concept requires a joint, integrated STAMIS as the heart of the logistics management capability on the battlefield. (USACASCOM, September 1995)

With the technology demonstrated at Fort Lee (USACASCOM, September 1996), it becomes possible for the food manager to see exactly where all inbound shipments of food are in the supply pipeline. By gaining the total snapshot of the inventory moving from supplier to military warehouse, the manager or field commander gains insight on potential bottlenecks in the supply flow. The manager or commander can then bring resources to bear on specific, identified, constraints to ensure uninterrupted supply flows. The incorporation of the civilian sector with a VENEX-2 type system increases supply visibility and allows further elimination of wasted steps in the process. Specifically, supplies will no longer have to flow through Defense Depots to gain shipment visibility. Instead, these supplies can be tagged at the vendor and shipped directly to the appropriate shipping location for follow-on shipment to the theater of operations. Additionally, vendors potentially can receive aggregated orders from the military TAV network directly through the government system that has been integrated into their own networks (See Figure 7).

An additional benefit to developing such a system will come in the enhanced ability to schedule supply flows. Once the vendor is "tied" into the TAV network through a

system such as VENEX-2, the military distribution system becomes a "Shades of Green" system. This system process sees the logistical supply of commodities as a continuum from raw material to finished good.

In the case of the Unitized T-rations, it becomes more manageable to time the supply of foods into a unitizing point for configuration, tagging, and onward movement as meal modules. Meal Modules that incorporate separate components, such as the UGR-A, can now have those items tracked visually via computer to ensure shipments arrive at the same FRBP at the same time. This will alleviate previous problems exhibited in Desert Storm ration resupply. Also, this system can allow the vendor to suggest alternative shipping means, or to provide recommendations on how to improve supply flow through the system. For instance, the vendor may already have established supply lines or facilities near the hostile area that could provide the government savings in money or time.



## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **A. CONCLUSIONS**

In general, Prime Vendor is a valid resupply method. However, current operational plans do not match vendor capability. The ability of the private sector to react will be predicated by the speed at which they can absorb military demand in a contingency. Since the military demand is not projected to exceed 4% of total U.S. annual demand, difficulties in gross resupply of non-military-unique food items are not expected (DPSC, September, 1996). Unfortunately, effective resupply of subsistence in the national contingency mission necessary to match existing military plans cannot be accomplished. Plans must be changed to reflect budget reality, or funds must be allocated to develop a working subsistence supply capability congruent with existing plans. New methods of extending business partnerships in the management of inventory and demand must be established for responsible resupply of food to U.S. soldiers in a cost-effective and expedient manner.

### **B. RECOMMENDATIONS**

#### **1. Adopt Prime Vendor for Operational Rations other than MRE's**

DPSC is planning to adopt a zero-base inventory for rations other than MRE's. The effective integration of vendors will ensure that once DPSC's buffer stock is depleted, all foreseeable problems are acted upon before they become a crisis. Prime Vendors can



produce and provide vendor-managed inventory functions to dilute inventory holding costs within the much greater commercial market. In essence, providing the vendor with requirements and allowing them to provide the needed inventory response serves as a form of inventory consolidation for the military. Allowing the commercial sector to provide inventory response permits them to rotate stock with all their customers; military and civilian.

## **2. Match Planning to Fiscal Intent**

The DoD field feeding plans reviewed in the research for this thesis are unrealistic. The Services must be willing to spend money to either maintain inventories at appropriate levels or to implement complete solutions to plans. If inventories are not desired, then alternative plans must be built, researched, and established. At the end of Fiscal Year 1996, a moratorium was put in place by the Services on the consumption of operational rations (DPSC, September 1996) due to budget constraints. While this does provide a short-term cost-savings, inventory rotation rates drop, causing inventory to grow older.

This analysis has found that Prime Vendor, as a concept, is perfectly valid and possesses many opportunities. However, the mismatch of contingency plans with capability and the tendency to perform "end-runs" of these plans through LOG-CAP contracts or by outsourcing functions, is inefficient. As demonstrated, large gaps appear in planning, in essence forming logistical "loose bricks" (Hamal and Prahalad, May-June 1996) that can potentially be exploited by hostile nations.

While the previous method of handling food distribution is unwieldy and wasteful, an incautious move to contingency ration distribution via Prime Vendor could be

disastrous. If conducted unwisely, this may lead to "denominator management" (Hamel and Prahalad, 1996) and a failure to recognize and retain key core logistical competencies. Managers with a denominator management focus do not distinguish between external sourcing that "adds value" with outsourcing that causes a strategic weakness. Arbitrary replacement of an organization's internal competency may weaken other "deeply embedded organizational competencies." These deeply embedded competencies are those that are truly yielding "product embodied competitiveness" (Hamel and Prahalad, May-June 1989). In the case of the military, this "product embodied competitiveness" may be capabilities such as notification-to-deployment time, ability to sustain forces, ability to sustain morale, or the ability to exert appropriate force levels.

For example, food distribution is widely regarded as being a global industry. If a hostile country were to start misbehaving, they would not have to directly confront the U.S., but merely apply pressure to those businesses engaged in long term contracts with the military. While this may appear to have minor impact, if consideration of alliances and countries disapproving of U.S. policy is taken, the impact can become substantial. If these same countries know that the U.S. has reduced/eliminated inventories as cost-savings measures, then they know that little buffer stock exists to cover any variability in supply. Commercial companies now covering this reduced defense capacity are motivated largely by profit and regulatory compliance. Typically, these companies can be strongly influenced by changes in governmental attitudes and markets. As a result, certain countries may perceive the inability of the U.S. to react immediately by implementing established plans, as a weakness to be exploited.

The inadequate integration of plans, as analyzed in this study, presents a fundamentally flawed strategic fit between resources (budget) and opportunities (re-engineering). Instead, these plans appear to be generic strategies with a focus on a strategic hierarchy that does not identify a clear method of accomplishing stated goals. This type of dichotomy creates a logistical "loose brick" (Hamel and Prahalad, May-June 1989) that could pose a competitive disadvantage for the U.S. in the event of a major crisis. Current planning and solutions attempt to improve on existing methods by "playing the same game better" (Hamel and Prahalad, May-June 1989). Therefore, a shift to a more "Innovative Strategy Method" (Schuler and Jackson, August 1987) is needed to provide a better solution.

If the military is going to consider pursuing a strategy of adopting "Best Business Practices" via programs such as Prime Vendor, then the military must shift thinking to terms of "competitive advantage" (Porter, 1985) and "organizational uniqueness" (Ulrich and Lake, 1991). Prime Vendor programs can help the Army gain competitive advantage by building on the Army's core competencies and allowing it to outsource those functions that do not add value to those competencies, while, at the same time, supporting synergistic partnerships between the Army and its Prime Vendors. However, unwise application of outsourcing can inadvertently eliminate valuable competencies along with non-value added activities. According to Pfeffer (February, 1995), sources of competitive advantage evolve over time and should be analyzed in terms of both external and internal environments (Pfeffer, February, 1995; Barney, November, 1995). As these environments are dynamic, competitive advantages may change as the result of "value migration" in

customer needs and priorities that can be dealt with by discarding obsolescent business designs that have tended to remain fixed (Slywotzky, 1996).

Specifically, competitive advantage can be achieved by the way we match customer needs to core competencies and produce true organizational uniqueness. Organizational uniqueness is the extent that each one of our business (waging war) elements (logistics, combat arms, combat support) have world class performance. If carefully translated, such principles can be readily adopted to military planning and execution. As an example, the Army constantly seeks to gain competitive advantages over other military forces to ensure dominance on the battlefield. This has been done in the past by clarifying organizational uniqueness in terms of force projection with a strategic business partner; the Air Force in Air-Land Battle Doctrine.

While economic battles being waged in the private sector differ from battles engaged in military conflict, the jockeying for dominance and the attempt to gain an advantage for decisive victory are strikingly similar. However, the emphasis on competitive advantage must come from both an internal and external analysis of core competencies across organizational boundaries. Such thinking requires a paradigm shift from traditional hierarchal and marketplace strategy to one that combines the best of both, allowing the military control of its processes while retaining the market advantages of the private sector.

Traditionally, commercial companies and the military have sought downsizing and outsourcing of functions to improve productivity or to lower costs. When not carefully conducted, downsizing has been termed "dumbsizing" (Markels and Murray, March

1996). Establishment of an effective supply plan requires a true rethinking of the process, not simply a focus on shrinking the government's share of it. Too often, both private business and the government equate downsizing with efficiency (Hammer, July 1996). The outsourcing of subsistence support and other logistical support should not be merely a short-term reaction to changes in the environment, but rather as a carefully constructed long-term strategic plan (Bruton, May 1996). In my proposed model using VENEX-2 (Figure 7), the commercial sector becomes a strategic business partner as opposed to a replacement capability.

The way for the U.S. military to truly exact a real "competitive edge" in logistical support, lies in the fundamental changes that must take place in the way we "play the game." For instance, if supply support is to be truly effective, movement must be made away from the concept of "government/military" or "commercial" support. This has served to limit the current planning process and create a situation where no truly comprehensive solution is being pursued. Instead, a movement towards a "shades of green" supply mentality must be incorporated into the military thought process. The commercial supplier becomes our business partner and supplies can be seen as gaining more military identity as they move through the total pipeline.

### **3. Develop Peacetime Usage and Inventory**

Peacetime Use of Operational Rations will provide the military with valuable lessons and feedback on the actual use of rations. To date, the industrial base has demonstrated an unwillingness to expand their commitment to providing military ration configurations unless a sufficient on-going draw of these rations occurs. This has directly

created a shortfall in the ability to provide T-rations in the current conflict scenario. If vendor-managed inventory practices are used in conjunction with other initiatives, cost-savings can be realized that would offset expenses. These off-sets would come in the form of private sector experience in configuring these rations, feedback in ration improvements, a "warm base" of production that can more easily ramp up for contingencies, and training for military food-handlers and cooks.

#### **4. Standardize Service Subsistence Requirements**

Currently, each Service maintains a different field feeding plan that requires slightly different configurations of the same basic ration type. This practice is wasteful and dilutes an already small peacetime military demand on the commercial sector. In any given theater of operations, each Service will be promoting the use of a different ration type, requiring different preparation procedures, accountability procedures, and inspections. Even if one ration became the designated ration of use in the theater, personnel from the other services would have to be made aware of the differences in rations to ensure adequate meal preparation and accountability of supplies. Greater economies of scale and improved efficiency could be achieved by defining Service ration requirements according to the same ration configurations. This also reduces the amount and type of training required to produce, distribute, and use rations.

#### **5. Adopt VENEX-2 (Modified)**

VENEX-2, in a modified form, provides the ability to tightly integrate commercial suppliers into the military network while retaining flexibility in support. The integration of commercial vendors allows for tight business partnerships and the ability to share common

“visions” of supply support. In the event of the termination of a supplier, the lessons learned from integration can be applied to new suppliers thus lowering the learning curve of implementation. VENEX-2 provides the advantage of obtaining complete supply visibility without relying on integration at a single military-controlled point. This reduces the chances of commercial supplies becoming backlogged at a distribution point, and reduces the strain at “downsized” supply depots. Costs to implement VENEX-2 for the medical community at seven vendors has been estimated to be \$1.361 million for a 12 month period including travel, implementation, equipment, Volpe G&A, contractor support, and labor. (Ken Troup, June 1996)

However, implementation of VENEX-2 will tend to create an organization without boundaries. As information flows between the vendor and the military customer, clear distinctions between where the vendor stops and the military begins will begin to blur. Careful partnering and stakeholder management must be undertaken in concert with VENEX-2 to reap the total benefits that can be gained from data integration. (Harrison, May 1996)

## **C. RECOMMENDATIONS FOR FURTHER STUDY**

### **1. Standardized Rations**

During the course of this thesis the food distribution plan has remained in dynamic flux. In addition the emergence of diverging ration support plans by each of the Services is troublesome. This may dilute the ability of the military to gain economies of scale and to implement a working peacetime plan. Several new technologies, such as polymeric T-

ration cans, are being studied that may fundamentally change the shortcomings of rations as discussed here. Ration configurations should incorporate these technologies, if adequate, to develop a standard ration family for all Services.

## **2. Inventory Maintenance vs. Ordering Costs for Operational Rations**

Current plans have proven inadequate for the national contingency mission. However, to support a peacetime level of inventory (vendor or government controlled), detailed analysis should be conducted to determine the costs of holding inventory versus trying to order it all in a contingency. Plans examined in this thesis did not evaluate this tradeoff, but the general opinion expressed was that inventories were too expensive.

## **3. Measuring Logistics Effectiveness**

Discreet measures of logistics effectiveness in how and when to order are crucial. In the food realm, food previously had been held for extended lengths of time without regard for customer preferences. This choice was often made due to cost and not according to any definitive set of logistics decision models or effectiveness measures.

## **4. Application of Model to other Commodities**

This thesis provides the basis of a TAV model that should be examined for application to other commodities in either a limited or complete fashion. Commodities that may be amenable to a Prime Vendor/VENEX-2 application include repair parts, at least those that are common with the automotive industry, and bulk fuel shipments.

## **5. Cost Analysis of Contractor Logistics vs. Military Logistics Support**

The Bosnian Operation used a commercial vendor to provide ration breakdown and logistics support in Bosnia. This support was regarded by those interviewed in this



thesis as being expensive. When queried as to why a Perishable Subsistence Platoon had not been deployed, no definitive answer was given. A cost/benefit analysis limited to this aspect of the operation could lead to insight on LOGCAP break-even points and military risk analysis.

## **6. Depot vs. Commercial Unitization**

The final location and type of unitizing point for the UGR family of rations has not been determined. Commercial vendors have the capability of providing unitizing capabilities, but existing production lines at DoD depots can also provide this function. Near two of these Depots there may be reserve units who could be mobilized in a conflict to provide "surge support" in the production of UGRs. Additionally, if these depots and units were used for this mission, the units could conduct periodic training that may support a peacetime usage rate. A cost-benefit analysis coupled with a capacity-load analysis would provide valuable insight on the disposition of unitization points and the supportability of a peacetime inventory/use policy of UGRs.

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U.S. Army Logistics Management College  
Fort Lee, Virginia, 23801-6043
  
4. Office of the Deputy Chief of Staff for Logistics.....1  
ATTN: DALO-TST (COL Tolleson), Room 1E583  
500 Army Pentagon  
Washington, DC 20310
  
5. Commander.....1  
United States Army Combined Arms Support Command  
Fort Lee, Virginia 23801
  
6. Logistics Chairman.....1  
Department of Systems Management  
Naval Postgraduate School  
411 Dyer Rd.  
Monterey, CA 93943-5101
  
7. Professor Jane Feitler, code SM/FJ.....1  
Department of Systems Management  
Naval Postgraduate School  
411 Dyer Rd.  
Monterey, CA 93943-5101
  
8. Professor Erik Jansen, code SM/EK.....1  
Department of Systems Management  
Naval Postgraduate School  
411 Dyer Rd.  
Monterey, CA 93943-5101



9. Dave Matthews, code SM/MD.....1  
Department of Systems Management  
Naval Postgraduate School  
411 Dyer Rd.  
Monterey, CA 93943-5101
10. CPT David B. Bailey.....2  
2404 Sir Johns Court  
Louisville, KY 40220